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COMPUTERWORLD

Vendors to simplify client/server prices

By Rosemary Cafasso

DAVE MARSHALL

Succumbing to user pressure, two heavy hitters in the client/server application market will soon simplify their pricing structures, which these days can require a rocket scientist to decipher.

Officials at Dun & Bradstreet Software and SAP America, Inc. last week said they are evaluating options that would focus more on value-based pricing and less on hardware and other criteria. Both companies confirmed they will announce changes within a few months.

Industry observers said such changes are critical in an industry where pricing is all over the map and can make software licensing a nightmare.

While most client/server software providers have their own particular twists, they typically base pricing on combinations of number of users, servers and

Client/server, *page 12*

IBM overshoots

Parallel System/390 pricing much too high, users warn

By Craig Stedman

Initial pricing of IBM's parallel System/390 hardware is higher than expected — about $27,000 per MIPS. Users last week said that price is too steep to make the systems a compelling alternative to traditional mainframes.

Industry observers were expecting prices in the $20,000-per-MIPS range for the CMOS-based parallel systems, which will start replacing IBM's ES/9000 mainframes during the next two years. Customers have been counting on the parallel systems to reduce the cost of mainframe computing to more Unix-like levels.

But analysts briefed by IBM in the past two weeks said the computer giant is concerned that cutting prices too close to the bone may weaken demand for water-cooled ES/9000s. That, in turn, could force more rapid price reductions on those machines than IBM executives could stomach.

Users willing to wait

Yet customers at several large mainframe shops said the cost of the parallel machines will have to fall to $20,000 per MIPS before they will open their checkbooks. The difference between the two prices is significant, amounting to $700,000 for each 100 MIPS of processing power.

George Sekeley, president of CSX Technology, Inc., the informa-

IBM, *page 16*

Buyers' market

IBM is "going to have to get warmed up to the reality of what the market will pay," said Rich Evans, an analyst at Meta Group, Inc. in Westport, Conn. "Hopefully this is just the first part of the cocktail party because if not, [the parallel machines] aren't very interesting." He said he has "seen some really ugly prices" on the parallel systems.

Object engine to pump up AppWare

By Elisabeth Horwitt and Melinda-Carol Ballou

Novell, Inc. plans to announce by the end of this month an object-based strategy for providing information systems managers with tools to design distributed applications for multivendor client/server environments.

The strategy will center on two upcoming announcements. A distributed version of Novell's AppWare application environment, expected out by year's end, will enable users to implement pieces of an application on different client systems.

Further out, Novell plans to announce a "universal object request broker" that will reside on a NetWare server, and possibly a UnixWare server, thus allowing distributed pieces of an applica-

Novell, *page 10*

Borland slide accelerates

'94 loss hits $70M; customer faith wavers

By William Brandel

"It was a tough, tough quarter," said Borland Chairman Philippe Kahn. And a pretty bad year, judging by last week's release of Borland's oft-delayed quarterly and year-end results.

After three delays, a struggling Borland International, Inc. last week posted a loss of $70 million on $393.5 million in revenue for its fiscal year 1994. That represents a 15.2% decrease in revenue from fiscal 1993, when the company posted $464 million in revenue and a $49.2 million loss.

Profit long gone

The company also reported a loss of $76 million for the fourth quarter ended March 31, compared with a profit of $5.1 million for the same period last year.

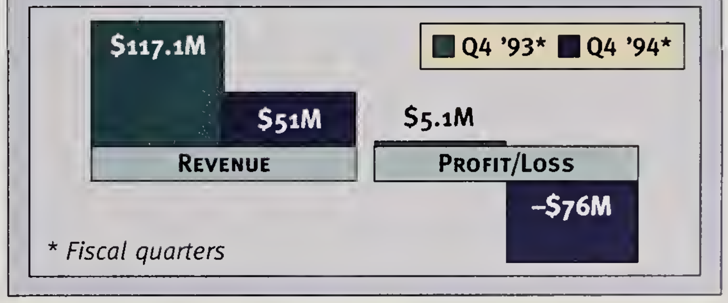
Worse still, the company said it expects an operating loss for the first quarter of its fiscal year 1995, which ends June 30.

For the second quarter, Borland bases a large part of its earnings expectations on sales of dBase for Windows and a new DOS version of the product that will be introduced at PC Expo in New York later

Borland, *page 14*

A turn for the worse

Borland's fourth-quarter revenue is down 56.4% from the same period last year



* Fiscal quarters

Mainframe dilemma

IS brain drain depletes ranks

By Julia King

Longtime computing professionals searching for career stability are leaving corporate information systems departments and embarking on second careers far from the fast-changing arena of information technology.

Many of these so-called IS refugees are taking with them valuable mainframe expertise, leaving in the lurch hundreds of companies still very much dependent on mainframe applications. They are also leaving a raft of unfilled mainframe jobs in their wake, some IS watchers say.

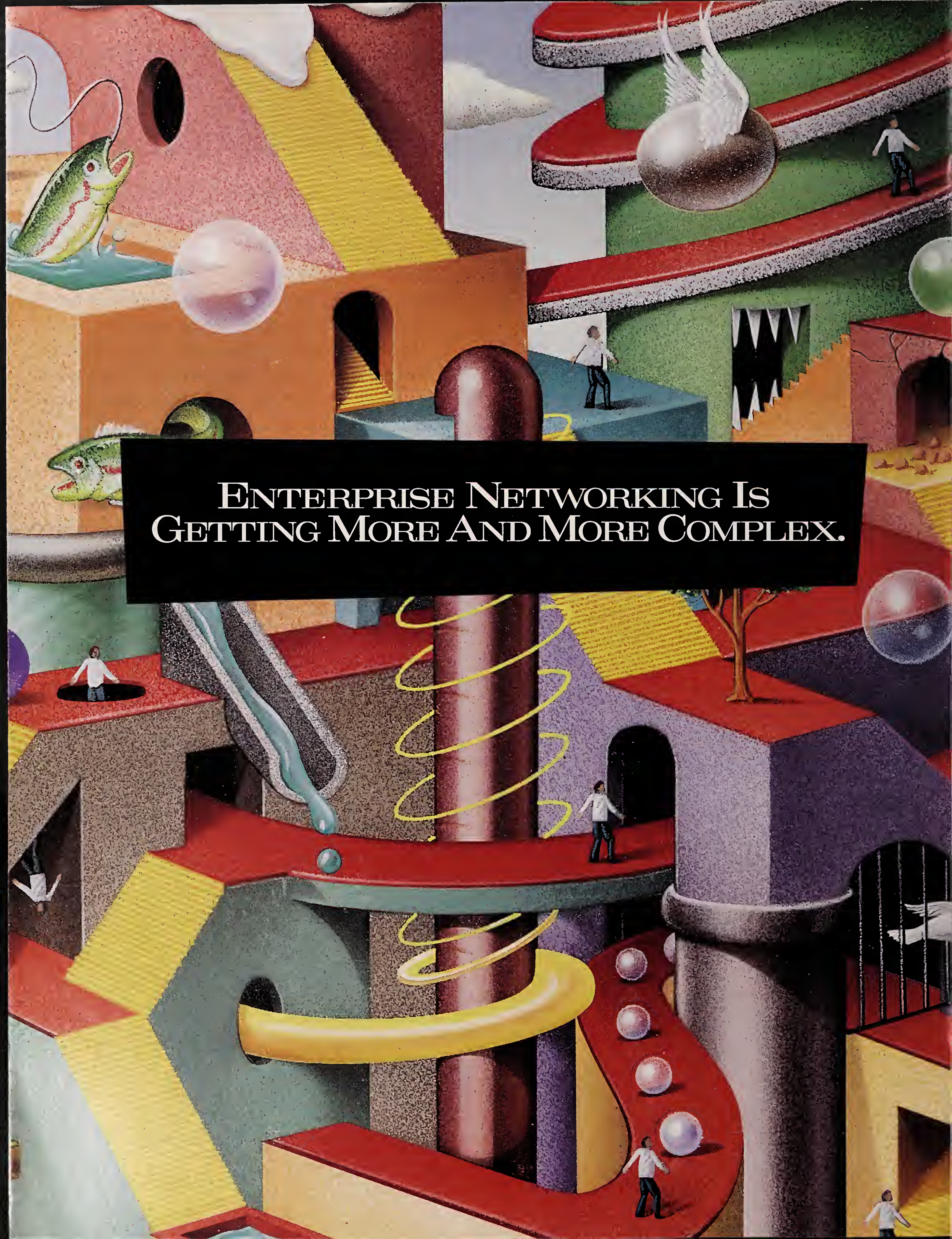
"There is definitely a brain drain going on in IS, and [as a result], organizational memory is walking out the door," said Stewart Stokes, president of the Boston chapter of

Brain drain, *page 29*

ANDY FREEBERG

Joanne Ward *is preparing to leave her 30-year IS career for the comforts of her own pie-baking business. Job uncertainties drove her decision.*

Newspaper


ENTERPRISE NETWORKING IS GETTING MORE AND MORE COMPLEX.

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What's Inside

June 6, 1994

Los Angeles citizens are interactively involved in rebuilding their city thanks to a simulator created at the University of California at Los Angeles. UCLA is a *Computerworld* Smithsonian Award finalist.

IN DEPTH

This week we honor the Sixth Annual *Computerworld* Smithsonian Award finalists, an illustrious group of organizations using technology to benefit humanity.

See page 119

NEWS

- **With Compaq rolling back prices** on various types of PCs, analysts expect another wave of industrywide price cutting. Some list prices may drop more than 20%. *Page 4*
- **Taligent will release this week** the first code of its much-anticipated object-oriented operating system at its first developer's conference. *Page 8*
- There may be flaws in the government's **Clipper encryption technology,** but experts say those flaws shouldn't be fatal. *Page 8*
- New tools from **Bachman Information Systems** target client/server applications. *Page 12*
- **IS spending on LANs continues to grow** at the expense of mainframes, according to one regional study. *Page 12*
- Informix is expected to roll out an **object-oriented 4GL** that takes object technology more seriously than rival offerings from Oracle and Sybase. *Page 20*
- Sales of **Unix SMP systems are growing quickly,** as users seek powerful database servers for their client/server applications. *Page 29*

COMPUTER INDUSTRY

- GIS vendor Strategic Mapping tries to reach mainstream users with **mapping capabilities** embedded in common applications. *Page 30*

DESKTOP COMPUTING

- Vendors are taking a page out of the IS playbook and **outsourcing technical support** to third parties. *Page 39*

WORKGROUP COMPUTING

- **ATM to the desktop?** When and why. *Page 47*

ENTERPRISE NETWORKING

- Vendors are lining up to offer **hierarchical storage management.** *Page 55*

LARGE SYSTEMS

- EMC's latest disk arrays target performance and capacity. *Page 67*

APPLICATION DEVELOPMENT

- **Rival application development firms** Gupta and Uniface continue to one-up each other, with both firms adding rudimentary object programming features to their tool kits. *Page 75*

THE CW GUIDE TO RDBMS

- **Relational database vendors** are rushing to add distributed capabilities, but consultant David McGoveran says they have a long way to go before they offer truly "distributed DBMS." Systems administration is a particular weakness of today's products. Oracle heads the Buyers' Scorecard survey. *Page 111*

CAREERS

- If you're interested in **Unix systems administration,** check out the skills that hiring managers are seeking. *Page 124*
- **Novell's NetWare for OS/2.** Do you need to know it? *Page 125*

MARKETPLACE

- The **PowerPC clone market** will be slow to develop. In fact, analysts recommend waiting 12 to 24 months to buy when native 32-bit applications will be available in quantity. *Page 133*

COMMENTARY

- **Paul Gillin** observes that while users may like Chicago, IS managers are the ones who will have to implement new strategies based on a new Windows operating system. *Page 34*
- **Charles Babcock** says people may have forgotten that IBM is doing with OS/2 today what Microsoft promises to do with Chicago. *Page 6*
- The list of qualifications needed by CIOs is shifting again, with technical knowledge taking on new importance, **Max Hopper** says. *Page 35*
- **Paul Strassmann** finds evidence that decentralization doesn't necessarily bring business success. *Page 35*

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Executive Briefing

What happens when IS executives move on? On the personal side, there is a new option: becoming a CIO for hire. Charles Feld and Richard Koeller are CIOs who found themselves at a crossroads in their careers. But while Feld sees the CIO-for-hire way as the road to new challenges and opportunities, Koeller sees it as the road to risk. *Page 83*

On the corporate side, brain drain is kicking in. Longtime computing professionals are fleeing corporate IS groups in search of career stability and embarking on second careers. Many of these so-called IS refugees are taking with them valuable mainframe expertise, leaving in the lurch hundreds of companies still very much dependent on mainframe applications. And leaving, some IS watchers say, a raft of unfilled mainframe job postings in their wake. *Cover 1*

Getting pricing information about client/server applications can be likened to drawing a price out of a car dealer. Now, user pressure may lead two heavy hitters in the client/server application market to simplify their pricing structures. Officials from Dun & Bradstreet Software and SAP America are evaluating options that would focus more on value-based pricing and less on hardware and other criteria. Both companies confirmed they will announce changes within a few months. *Cover 1*

The Long Island Railroad is using client/server systems to monitor the on-time performance of 725 passenger trains daily. Some 250,000 passenger trips are being "tracked" by a combination of Sun workstations running Sybase databases and a Stratus Unix server. *Page 47*

The key to predicting the weather rests not with your local TV meteorologist but with the computer running the forecasting model. The National Weather Service is tossing more computing power at the model, replacing its primary forecasting engine with a supercomputer five times faster. The result is expected to be more accurate predictions and more timely severe storm warnings. *Page 65*

"Ergonomic" keyboards, arm rests and wrist splints continue to appear on the market, promising to address repetitive stress injuries. But ergonomics experts agree on one unhappy fact: There is no scientific proof these gadgets do any good. In fact, sometimes the arm rests, wrist rests and splints actually make matters worse. *Page 6*

The 5th Wave *by* Rich Tennant

Get the Huggies, hon-she's reaching for the Diaper icon

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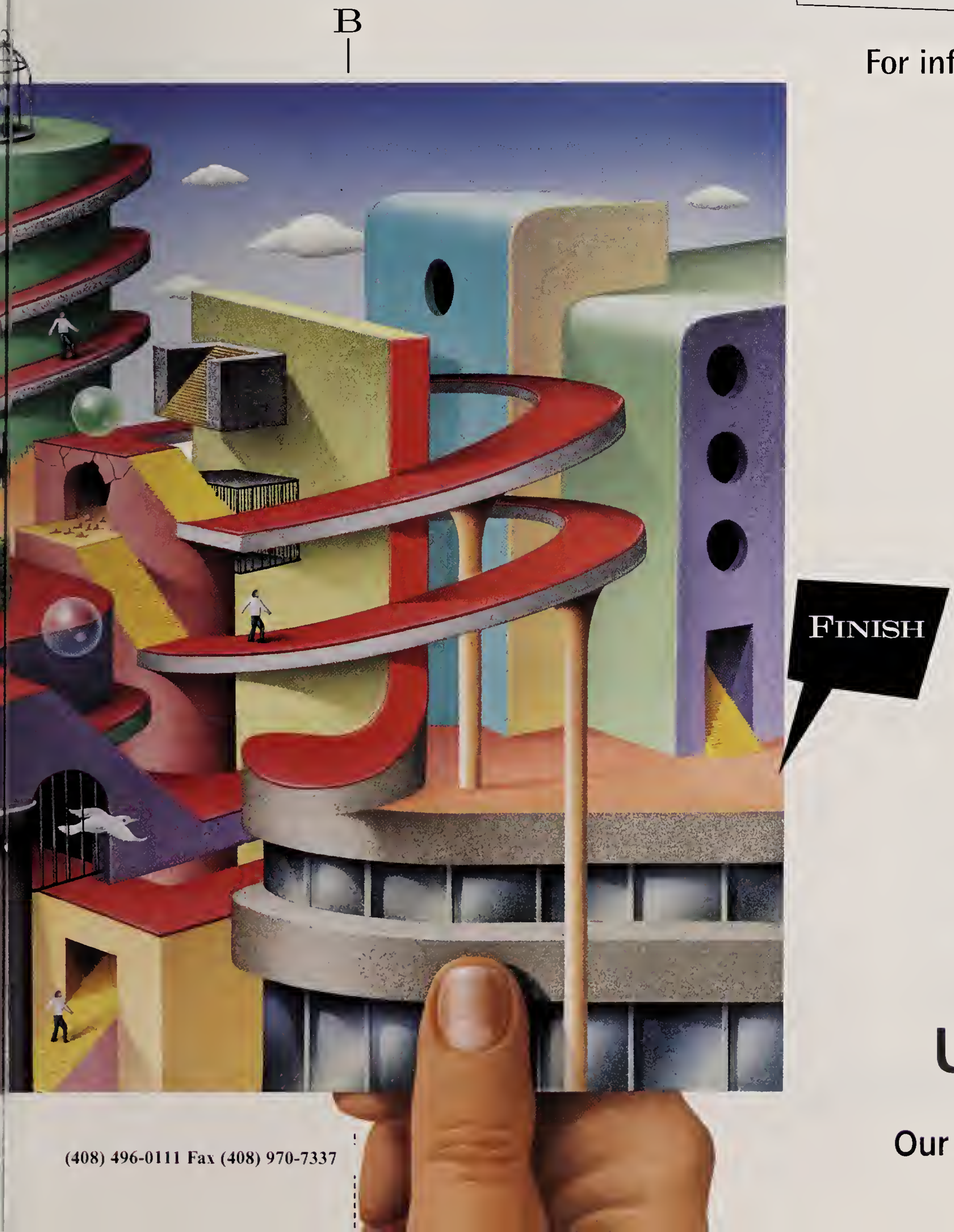

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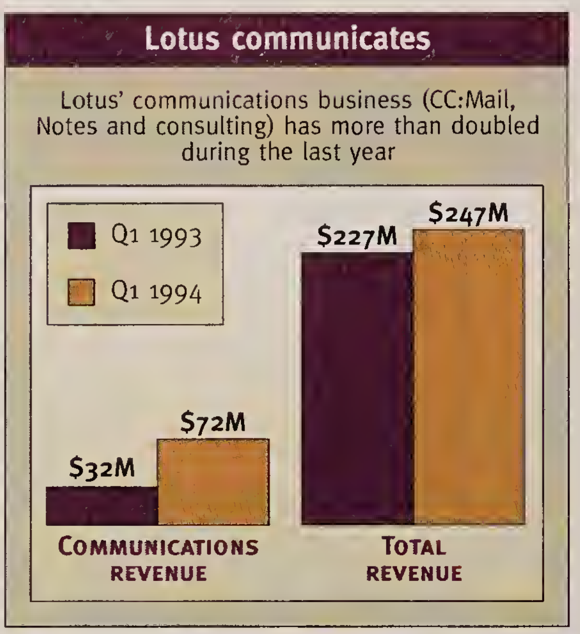
Lotus seeks to cement IS partnership

By William Brandel

In marked contrast to some of the annual meetings Lotus Development Corp. has held in past years, the vendor's recent get-together in Cambridge, Mass., was decidedly upbeat. The company is profitable, its stock is high, and its flagship product, Notes, goes unchallenged in the market.

Even so, Lotus Chairman Jim Manzi is already eyeing the company's next transition: from software provider to partner with corporate information systems shops. Lotus will not be measured by its technology and financial strength only but "by the way we do business," Manzi said. Customers, competitors and analysts could not agree more.


Lotus communicates

Lotus' communications business (CC:Mail, Notes and consulting) has more than doubled during the last year

Source: Furman Selz, Inc., New York

Changing world

Manzi's revelation coincides with the intended merger of Novell, Inc. and WordPerfect Corp., the increased domination in the market by Microsoft Corp. and the decline of Borland International, Inc. — all of which add up to a new market dynamic in the works and not necessarily one friendly to Lotus.

"Lotus comes out the loser from the WordPerfect/Novell merger," said David Marshak, an analyst at Patricia Seybold Group in Boston. "With the Notes momentum, they have a solid strategy for now. But once WordPerfect/Novell gets its act together, it means more competition for Lotus across all its product lines."

It is clear Lotus faces fiercer competition. Microsoft contests Lotus for desktop applications and electronic mail, while WordPerfect and Novell are a major potential threat in the LAN-based workflow application market. The only vendor that does not threaten Lotus is Borland because its applications cross Lotus' only in the Approach database space.

New market strategy

At the same time, Lotus' annual revenue of $981 million makes it 22% the size of Microsoft, which has $4.4 billion in annual revenue, and soon it will have just half the combined revenue of WordPerfect ($707 million) and Novell ($1.2 billion). To compete in this new market, Lotus must leave behind markets it cannot win while making sure to leverage markets it now dominates.

That one market is Notes. Citing its own figures, Lotus officials said Notes has been installed at more than 3,500 accounts, with more than 750,000 seats. Its presence at Fortune 500 companies is ever-increasing.

But while Lotus pitches Notes as a mission-critical application and bridge to upper IS echelons, it has far to go before becoming the IS partner Manzi speaks of.

"I have not found our Lotus relationship to be a partnership so far," said Jim Ruhlman, MIS director at Michigan Sugar Co. in Saginaw, Mich. The firm is a subsidiary of Savanna Foods, which supports 550 end users on Lotus' CC:Mail, 1-2-3 spreadsheet and Ami Pro word processor. "If anything, I've been seeing less support from them recently, rather than more," Ruhlman said. "If they're concentrating on becoming a partner, then I haven't seen it."

Manzi acknowledges that his company has to sharpen its game in this regard. "I think there are some issues we have to work on in building relationships with these companies," he said. "We still have a lot of work to do on a few items, but we are committed to doing it."

For example, users said Lotus needs to provide better insight into how Notes could be used as an application development platform for line of business applications, instead of focusing on its document-centric capabilities. Users also want stronger development tools to build these applications and, at the same time, make Notes easier to install (see story page 16).

"They have to quit focusing on features and concentrate on helping users achieve their objectives," said Steve Riley, systems analyst at Ashland Chemical. "We need to see a more long-term strategy for Notes and us."

"Our greatest danger [lies in] capsizing ourselves by putting too much in the boat," Manzi said at the annual meeting late last month.

Or, as another Lotus official said, "In today's market, we can afford to make only one mistake. Microsoft can afford to make two."

Currently, Lotus derives 70% of its revenue from desktop business applications. In the suite market — the standard for measuring application usage in the desktop application market — Lotus holds less than a 19% share with its SmartSuite. Microsoft holds almost the entire remaining 80% of that market, while Borland and WordPerfect hold slivers of a share.

Lotus, *page 15*

No need to wait for Notes/AT&T net

By Lynda Radosevich

Unbeknownst to some Notes users, they do not have to wait for services promised via the forthcoming public Notes network that AT&T Corp. and Lotus Development Corp. announced last March. There are a number of networks that already provide some of these services.

For example, CompuServe, Inc. in Columbus, Ohio, will roll out this week a feature in its public Notes service that lets Notes users receive all messages from an Internet mailing list in a formatted Notes database. This makes the data easier to manage and integrate into other Windows applications.

And Wolf Communications Co., a Houston start-up, recently added capabilities to its WorldCom public Notes network that let international users link to its Notes databases over a dedicated, high-speed communications link.

The new features are a small sample of Wolf Communications' and CompuServe's services for Notes sites. Their services are increasingly capturing the attention of firms that want to link to other Notes sites but do not want to wait for AT&T Network Notes, which will not be complete until 1995.

"I want something that is here today. The AT&T Notes network is still vaporware," said Monica Burke, Lotus' Notes administrator at Sony Music Entertainment, Inc. in New York. Sony is using WorldCom to connect with fellow members of the New York Lotus Notes Users' Group.

For six months, Wolf Communications and CompuServe have offered public Notes services with these benefits:

- Access to public Notes databases and information service feeds such as the Associated Press News Wire.
- The ability to post corporate database systems on the servers for access only by approved users, such as mobile users or remote offices.
- The ability to connect Notes users through the services to the Internet, X.400 and other messaging networks.

The advantages of using a Notes service for business communications over networks such as the Internet are manyfold and include built-in security, access control and accountability. For instance, one user at a recent conference asked, "When the Internet goes down, who do you call?" In a Notes service, users call the provider.

Also, public Notes databases track discussion threads and enable users to post documents and catalogs in addition to sending messages. For companies that already use Notes internally, public Notes servers are a familiar way to extend the network.

What Lotus and AT&T are promising is similar in several aspects to the WorldCom and CompuServe services (see story at right). Users said part of the AT&T network's appeal is that it will off-load management of complex Notes networks to the service provider. Also, AT&T and Lotus are promising that businesses will be able to post catalogs and operate electronic commerce via AT&T Notes servers.

However, while Lotus and AT&T are already testing preliminary pieces of their partnered offerings, the public Notes servers and public access are only in the specifications stage, according to Larry Moore, vice president of telecommunications services at Lotus.

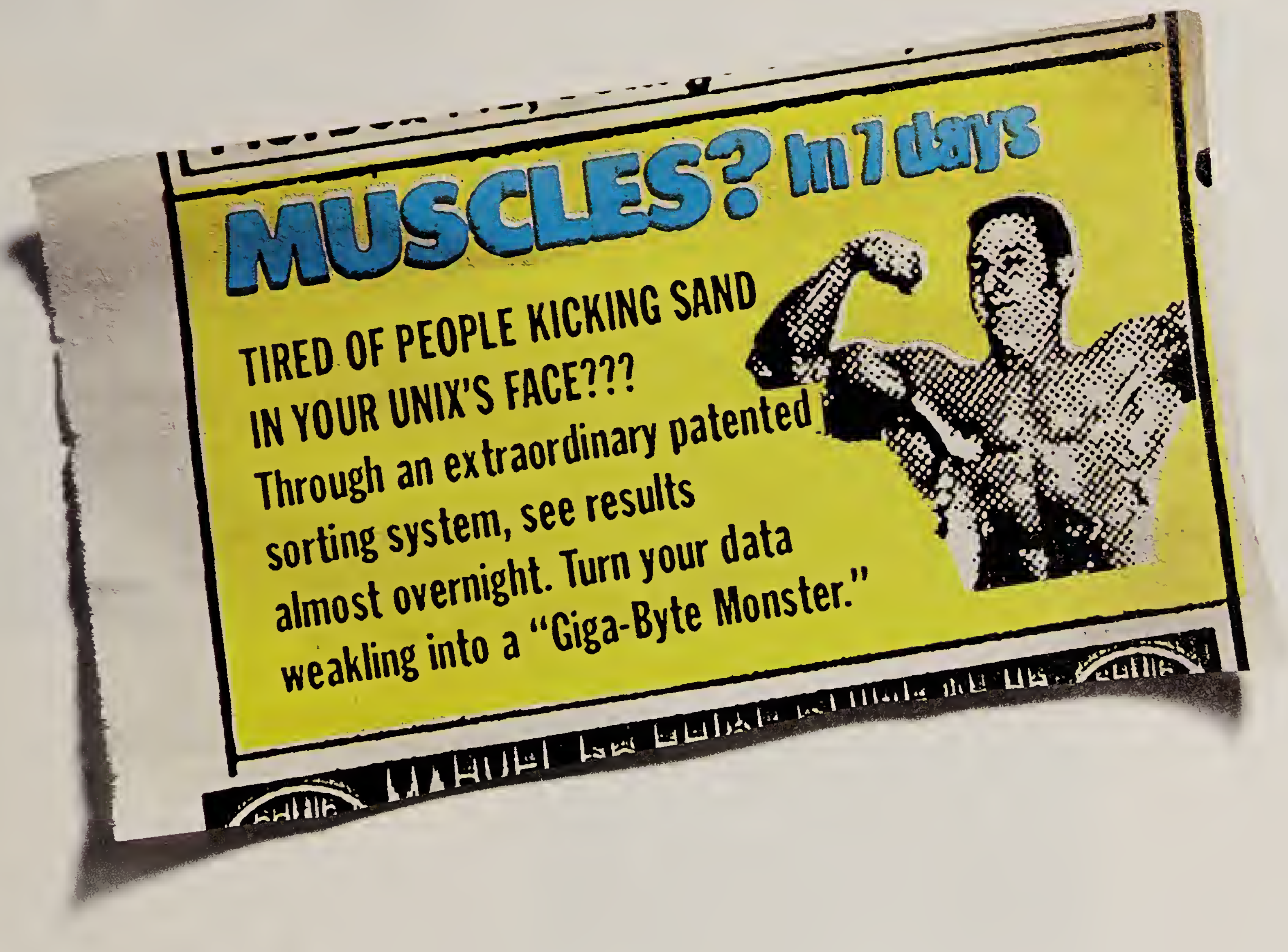
Before Lotus and AT&T can deliver, they face architectural challenges to making Notes work on a large scale. For example, Wolf Communications, which began testing its network more than a year ago, had to write dozens of utility programs to fill Notes gaps, according to Eric Sachs, a chief systems engineer at the company.

CIOs get hands-on groupware experience. See page 50.

Take five

The AT&T Network Notes benefits that users say they find most interesting — outsourced server administration and a foundation for offering on-line services — are the furthest away. Larry Moore, Lotus' vice president of telecommunications services, said AT&T Notes Network, from which Lotus will receive royalties, will unfold in the following five phases:

1. AT&T and Lotus are now testing for fall delivery a service that permits Notes users to dial a local number, punch in some codes and access their corporate Notes servers using 14.4K bit/sec. modems.
2. The companies are now testing Notes running on top of AT&T's InterSpan wide-area network service for fall delivery. Using InterSpan, which operates at T1 speeds, firms can give end users direct access to their Notes servers, rather than making them log on to a local server that replicates databases with other servers.
3. Outsourced Notes networks in which AT&T hosts the Notes servers will be implemented. Early tests are under way.
4. Extensions to Notes that allow authentication of user IDs among companies.
5. Electronic commerce, including a billing system so service providers can post their information and AT&T can provide billing. *— Lynda Radosevich*



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Price wars = more bang for buck

By Jaikumar Vijayan

Users planning to purchase desktop systems and PC servers will probably see system prices fall substantially during the next few months — by more than 20% in some cases. But such good fortune is not expected to trigger any buying stampedes, although it may raise corporate desktop standards.

In an announcement that analysts predict will trigger another round of price-cutting, Compaq Computer Corp. last week rolled back prices from 4% to a hefty 29% on a number of models across its product range. Analysts say other vendors will have to respond to remain price-competitive with an increasingly aggressive Compaq.

Cuts are making rounds

In addition, recent market trends, including an excess of supply in the channel and Intel Corp.'s continued push toward Pentium — and the subsequent fall in microprocessor prices — are creating conditions "that could cause a round of price cuts" in the future, said Richard Zwetchkenbaum, research manager of PC hardware programs at International Data Corp. in Framingham, Mass.

It appears, however, that the direct beneficiary of this price war, the user community, is becoming a bit blase about the stream of price reduction announcements.

One reason could be that despite all the price-cutting, the amount users spend on new systems will remain substantially the same, according to Phillippe de Marcillac, a research director at Dataquest, Inc. He noted that many customers are simply buying larger systems with the same amount of money.

Mark Lichtenberger, assistant director of field technology at Northwestern Mutual Life Insurance Co. in Milwaukee, is one such customer. He said he views price reductions as a way of getting more bang for the buck.

"What happens is that we simply buy systems that have faster processors, more disk capacity and even more memory," he said. "We can buy a DX4 100-MHz system for the same amount we paid for a much lower-performance system a year ago."

Other customers said price reductions were something they had come to expect. "Announcements like these don't cause us to go rushing out to buy a thousand more systems," said Richard Kolbe, director of MIS at Harley-Davidson, Inc. in Milwaukee. "It's getting to be a bit like these airfare wars. When somebody reduces fares, I expect others to lower their fares, too. We've been counting on that happening."

In fact, Compaq's price cuts follow by less than two weeks the IBM PC Co.'s decision to revamp its desktop and server lines and implement similar across-the-board price reductions.

The drop starts here

Highlights of the Compaq announcement include a 29% drop on its Contura Aero subnotebook PCs, which will now retail for $999. It also lowered prices on its high-end Pentium-based ProLiant 1000 and ProSignia models by as much as 18%. The ProLiant 1000 5/60 Model 1050 will ship for $6,500, and the ProSignia will start at $4,400.

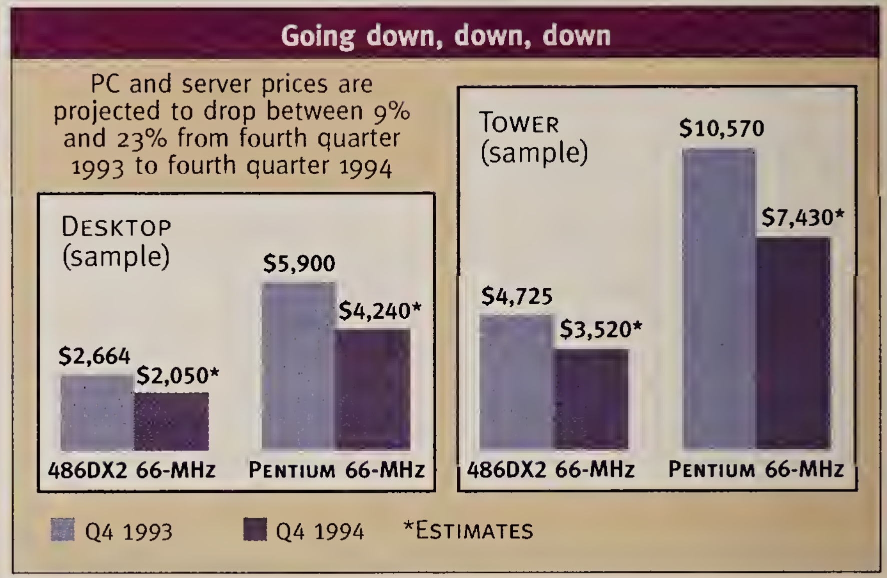
Major desktop vendors, such as Dell Computer Corp., Gateway 2000, Inc. and AST Research, Inc., have announced significant price cuts during the past few months. Similarly, most second-tier vendors have cut prices in the past few months, especially when launching new products. A recent study by WorkGroup Technologies, Inc. in Hampton, N.H., revealed that price cuts have had the most effect on portables, followed by servers and desktop computers.

"Compaq is not letting anybody breathe," especially as far as notebook and PC servers are concerned, said Randal Giusto, an analyst at BIS Strategic Decisions in Norwell, Mass. "While the desktop announcements were definitely a reaction to IBM's ValuePoint announcements, [Compaq] is dictating prices on servers and notebooks," he said.

"So far Compaq has been going after the file and print server marketplace, but now they want to go after the bigger, higher margin database application market," said Jennifer Munson, a research analyst at WorkGroup Technologies.

Average prices tumbling

Figures available from WorkGroup Technologies indicate that from January to May of this year, average prices on portable computers fell by 12%, on servers by 8% and on desktops by 6%. Over the next one month period, the company expects prices to fall by another 3% on desktops and servers and 4% on notebooks.


Going down, down, down

PC and server prices are projected to drop between 9% and 23% from fourth quarter 1993 to fourth quarter 1994

Source: International Data Corp., Framingham, Mass.

Putting on the squeeze

Compaq's big squeeze on prices could have repercussions for the rest of the industry — especially for the second-tier vendors, said Philippe de Marcillac, a research director at Dataquest. "The trend is definitely against clone manufacturers in general," he said.

In fact, a recent Dataquest study of PC trends worldwide indicated that larger vendors pushing the price envelope down were beginning to squeeze smaller second-tier vendors out of the market altogether.

For instance, while the Top 10 PC vendors exceeded the average industry revenue growth rate, second-tier vendors recorded a scant 2.2% growth — just over one-seventh the industry average of 15%. The Top 10 alone accounted for just over 50% of the market.

According to the study, with the larger vendors encroaching on their pricing territories, lower-tier vendors will have an increasingly difficult time remaining viable in the long term. — *Jaikumar Vijayan*

AIX security hole spurs user concern

By Gary H. Anthes

A security hole in IBM's AIX Unix operating system "big enough to drive two semis through," in the words of one user, has been discovered by a user in Germany and reported widely on the Internet.

The vulnerability exists in /bin/login — the software that runs as a user logs in — on all IBM AIX 3 systems. It allows remote users to obtain unauthorized root access on AIX hosts, essentially giving them carte blanche on the machines. The flaw also exists in Linux, which is PC-based Unix freeware available on the Internet.

According to the Computer Emergency Response Team (CERT) at Carnegie Mellon University in Pittsburgh, the flaw is not believed to exist in other versions of Unix.

Joerg Hallbauer, a senior systems programmer at Kaiser Pemanente Health Plan, Inc. in Pasadena, Calif., said he learned of the vulnerability from a colleague via electronic mail over the Internet. He successfully disabled the offending software on 10 IBM RS/6000 computers before any damage was done.

Hallbauer's machines are not connected to the Internet — "too risky" — but he said the flaw still presents a threat from internal users.

He added that he is concerned that IBM has apparently not notified users in any formal way. "If I didn't read Internet news and mail, I still would not know about this problem."

An IBM spokesman said the company posted an official notification of the vulnerability on an Internet bulletin board. He added that a permanent fix will be available this week and will be sent to all AIX customers.

Moira West, incident response manager at the CERT, said several users had sent in "wrapper" programs intended to surround /bin/login and protect against intrusions. "But the versions we saw would not protect you from all the possible exploitations of the vulnerability," she said. "Either apply the patch or the workaround; they will work."

Security precautions

For AIX:

- **Workaround:** Disable the rlogin daemon in /etc/inetd.conf.
- **Emergency fix:** Available via anonymous FTP from software.watson.ibm.com:/pub/rlogin/rlogin.tar.Z.
- **Official fix:** Can be ordered from IBM as APAR IX44254 by calling (800) 237-5511.

For Linux:

- **Patch available via anonymous FTP from sunsite.unc.edu:**

/pub/Linux/system/Network/sunacm/URGENT/README.security

/pub/Linux/system/Network/sunacm/URGENT/security.tgz

Corrections

Due to an editing error, an article in the May 30 issue incorrectly stated that Hewlett-Packard Co. warned analysts about a possible decline in revenue. HP in fact cautioned that revenue growth will slow down in the third quarter. HP expects revenue to grow, based in part on a 19% increase in orders, in the second quarter.

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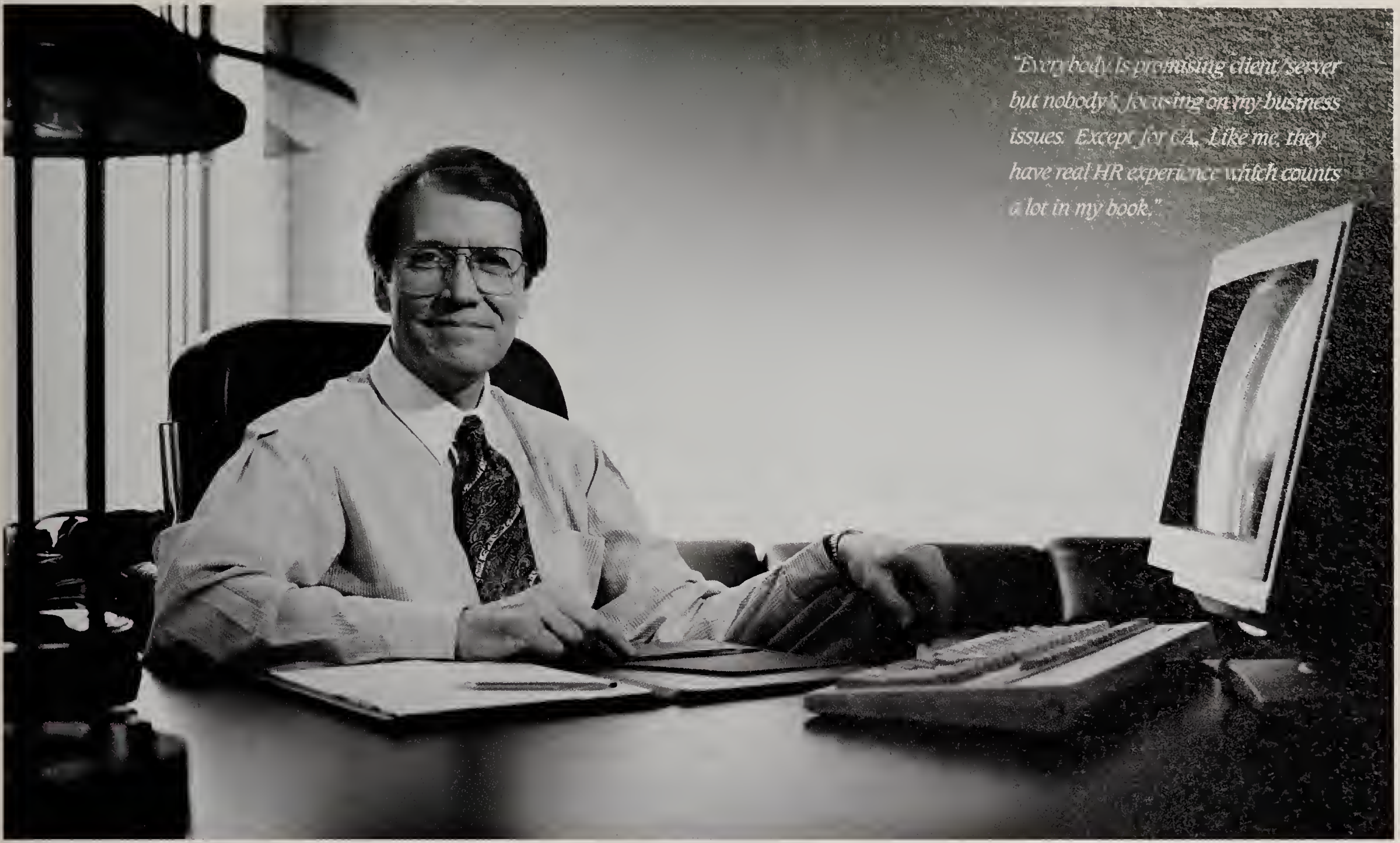

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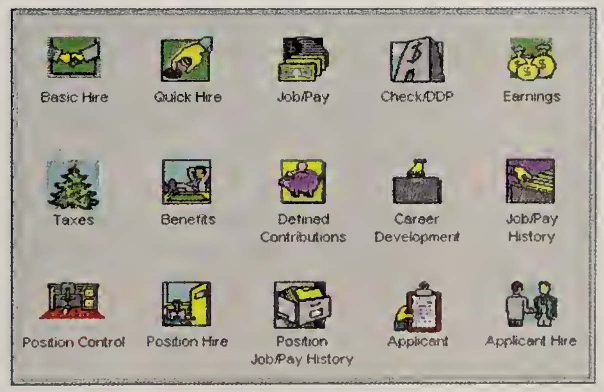

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Slender debut of Personal OS/2

At Comdex/Windows World in Atlanta recently, a large crowd gathered for each showing of Chicago, the upcoming successor to Windows, on the big screen at the Microsoft booth. An earnest product manager drew cheers each time he said Chicago will accept long file names. The MS/DOS-conditioned crowd could practically taste the freedom of breaking out of their 8-character confinement.

At the other end of the Georgia World Congress Center, behind the main IBM booth, Lana Meadows, a member of the OS/2 development team, quietly demonstrated Personal OS/2 for Windows to passersby in groups of two and threes. Personal OS/2, or OS/2 Lite as some like to call it, was running four applications and a clock.

OS/2 is not lite as in beer. Nothing has been taken out. Rather, a large desktop operating system has been condensed into a system that can run multiple applications in 4M bytes of memory. Not too many people seemed to care — although you have been able to use long file names with OS/2 for some time now.

Meadows showed Personal OS/2 running applications for three different environments — DOS, Windows and OS/2 applications — on a 4M-byte Toshiba laptop. Many viewers took her up on an offer for a $15 beta copy. It's possible IBM is about to shed its resource-hog image on the desktop and come up with an economical operating system that can work in tandem with an OS/2 server.

IBM is one of the few vendors with some prospect of enriching the desktop operating system picture by bringing out an OS/2 client/server team. In many ways this pairing represents what millions presumed Windows and Windows NT were going to be. But Windows is selling at a rate of 2 million copies a month, and expectations for the post-Windows era are focused on Chicago. If IBM wants a piece of the pie, it had better hurry. Personal OS/2 is expected out in six to nine months.

The Meta View

If IBM wants a piece of the pie, it had better hurry.

Charles Babcock

Best uses of resources

The resources of PCs for business applications are sometimes viewed as unlimited, but the Windows World Open contest at Comdex underscored how limited they can be. Borys Harmaty, project leader for winner The Bank of New York, said the bank's workstation application requires 16M bytes, so he ends up distributing "a lot of memory" along with it. He said that move is cheaper than trying to implement scaled-down versions of the application.

Dan Myrick of Marvin Windows & Doors, which offers architects and distributors a software program that helps design structures, said the Marvin application must run in 4M bytes of memory on 386-based PCs despite its intensely graphical nature. This is because most of its users are restricted to that level of PC.

The winner in the manufacturing category, Eastman Kodak, said it would move its PCs from 486s up to Pentium models soon, but another winner, Abasis S.A. de C.V., said most of its 180 user sites are running 286-based PCs. Not only are they running the old-style PCs, but the Mexican bank, winner in insurance/real estate, has unplugged its mainframe and now processes mortgage loans on the networked 286 PCs.

In another area, the winners tended to bring mainframe skills to their Windows application development, or wish that they had. The Bank of New York, for example, brought several mainframe software development managers into its workstation project because it was crucial that all parts of the application work as expected. (It includes several transaction-processing functions.) The code had to be reviewed and tested as it was constructed, not after all the parts were assembled and distributed to users. The bank brought in the managers "because that discipline exists on the mainframe side of the house." Those mainframe people may never go completely out of style.

Babcock is *Computerworld's* technical editor. His MCI Mail address is 575-2737.

Jury's still out on worth of stress-injury gadgets

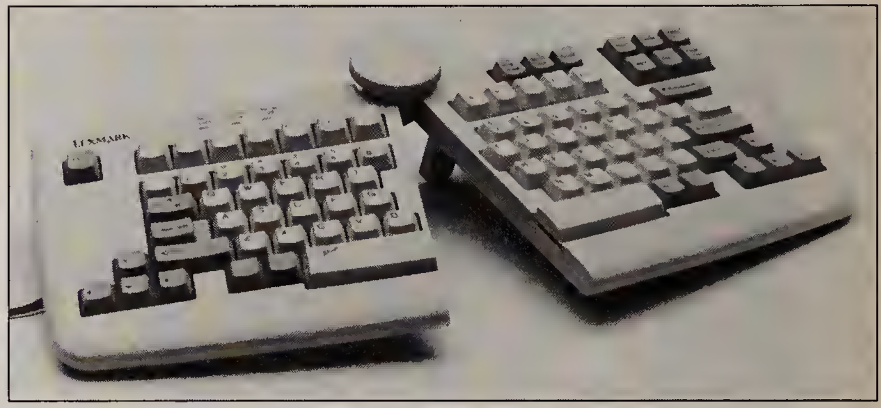
By Mitch Betts

As an increasing number of "ergonomic" keyboards, arm rests and wrist splints appear on the market to address repetitive stress injuries, ergonomics experts agree on one unhappy fact: There is no scientific proof these gadgets do any good.

In fact, sometimes the arm rests, wrist rests and splints actually make matters worse, said Alan Hedge, professor of human factors at Cornell University in Ithaca, N.Y., last week. The contraptions can put extra pressure on the sensitive wrist area, the site of carpal tunnel syndrome, or transfer the strain to the elbow or shoulder, he explained.

The ergo-gadgets industry "is like the health food industry," Hedge observed. "Eating a lot of organic tablets won't kill you, but no one knows whether it does you any good either."

"I wouldn't call it snake oil because the [ergonomic] products do help some people, but we should debunk the myth that there is a magic bullet," said Carl Henry, director of administrative computer services at Carleton College in Northfield, Minn.



Lexmark International's Select-Ease Keyboard *splits into left and right halves to offer users a variety of typing positions*

Devil in disguise?

On a positive note, experts said reputable vendors do refrain from making outlandish claims that their products can prevent or cure repetitive stress injuries. But there is a dearth of published scientific research on ergonomic products in real-world offices, while laboratory tests thus far have shown either tiny benefits or surprisingly negative results, experts said.

For example, Hedge just completed a study of forearm rests in which users found them too uncomfortable when adjusted for the correct wrist angle. When the arm rests were set at comfortable levels, the wrist angle was wrong, he reported.

Also, each user with a repetitive strain injury has a unique problem requiring a unique solution, Henry said, so information systems managers should not issue "sweeping standards" that require the same products for hundreds of users.

Henry said he is experimenting with a variety of ergonomic devices, not only to figure out what to recommend to campus end users, but also because he suffers pain from keyboard and mouse activity, too.

Hedge recommended that IS managers challenge vendors to provide scientific backup for their claims or perhaps volunteer to be a site for field tests of loaned equipment — before they purchase any.

Split decision

There are at least 20 vendors of wrist braces and a growing number of vendors of ergonomic keyboards. Last week, Lexmark International, Inc. in Lexington, Ky., unveiled a special keyboard that is split down the middle so each half can be angled for the most comfortable typing position. The keyboard retails for the relatively low price of $179.

Other vendors of ergonomic keyboards include Apple Computer, Inc., Key Tronic Corp. in Spokane, Wash., Health Care Keyboard Co. in Menomonee Falls, Wis., Kinesis Corp. in Bellevue, Wash., and Marquardt Switches, Inc. in Cazenovia, N.Y.

Some users say they love their alternative keyboard and that it saved their career. But "there is no scientific research to support their efficacy," said Robert F. Bettendorf, president of the Institute for Office Ergonomics, Inc. in Manchester Center, Vt.

Wrist braces or splints, which are worn to immobilize the wrist and keep it straight, are even more controversial. Many general-practice doctors recommend them to patients with symptoms of carpal tunnel syndrome, but "informed medical opinion is that these should not be worn while working," Bettendorf said. However, they can help protect the wrist while sleeping.

Yet wrist splints are increasingly popular. A recent survey of 100 companies found that 92% include wrist braces in their safety programs.

Stop slouching!

Ergonomics experts offer the following ergo-tips:

- Make sure the user's body is in a "neutral," or flat-wrist, position, with the back straight and the forearm and wrist in a straight line to the keyboard.
- Give top priority to training on proper posture and furniture adjustments.
- Invest in ergonomic, adjustable chairs for intensive keyboard users. This will do no good, however, unless users actually adjust the chair.
- See to it that users take frequent rest breaks and do some noncomputer tasks.
- Consider accessories such as document holders and adjustable keyboard drawers. Palm wrests (for the fleshy part of the hand) may be preferable to wrist rests that put pressure on the sensitive crease of the wrist. Soft wrist wrests are preferable to hard ones. — *Mitch Betts*

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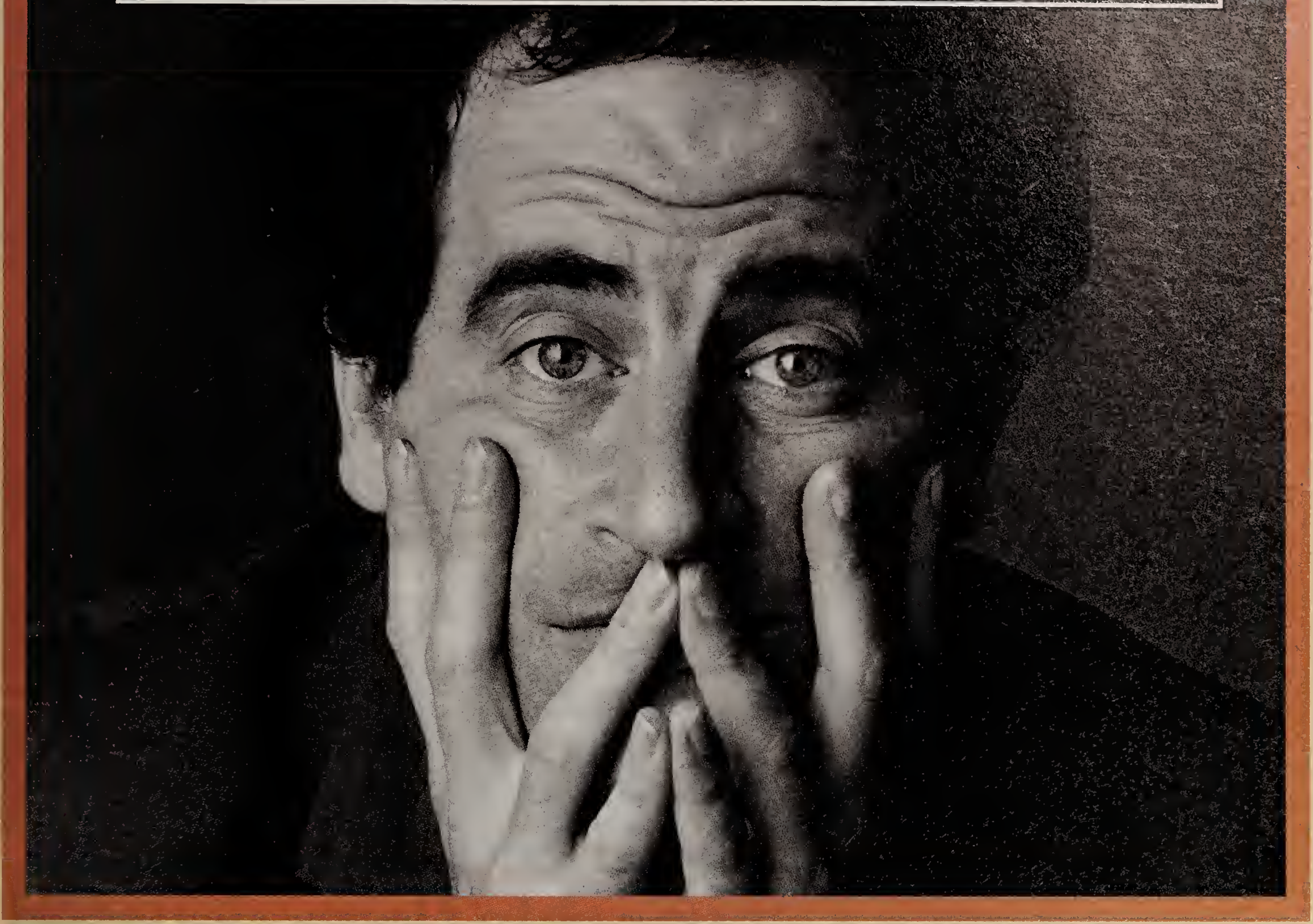

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News Shorts

Acer will spin off businesses

Acer, Inc. last week said it will spin off all of its 21 business units by the year 2000. Stan Shih, Acer's chairman and chief executive officer, said the company's goal is to maintain its brand name but make its affiliates more responsive to the needs of their local markets. "I would rather lose control and make profits than keep control and lose money," Shih said. Acer will spin off its peripherals and component distribution units this year and is targeting its Mexican, U.S. and Singapore units for 1995 and 1996.

Networking vendors get it together

3Com Corp. and **Novell, Inc.** last week announced integration of 3Com's Transcend network management system with Novell's NetWare Management System (NMS) 2.0. The move enables NMS users to collect network alerts and statistics from 3Com hubs and routers. 3Com also said it will support Novell's NetWare Link Services Protocol by year's end. This will ensure interoperability between Novell servers and routers and 3Com's NetBuilder family of bridges and routers.

Disaster-ous dealings

Computer Sciences Corp. last week announced that its CSC CompuSource outsourcing unit will take over 17 facilities management contracts from **Comdisco Disaster Recovery Services** under a $10 million agreement. As part of the agreement, Cary, N.C.-based CSC CompuSource will lease Comdisco's processing facility in Carlstadt, N.J., and has acquired the hardware used to support the 17 outsourcing contracts it acquired. In addition, CSC CompuSource has agreed to market Comdisco's business recovery services, including LAN/work area and voice recovery services. Meanwhile, Comdisco will market CSC CompuSource's check item capture service to financial institutions in the New York/New Jersey area.

Digital cuts Alpha prices, surfs the 'net

Digital Equipment Corp. is cutting prices on its Alpha AXP microprocessor this week, effective July 3. Prices range from $186 for the 21068 66-MHz chip to $1,083 for the 21064A 275-MHz model. Separately, the company said users can now order products and obtain software patches via the Internet. Digital has also signed a licensing agreement with **Spyglass, Inc.** to bundle Mosaic, an Internet navigation tool, on all of its Alpha AXP and Intel Corp.-based systems.

More support for Microsoft's mail server

In the latest of an anticipated avalanche of support announcements for **Microsoft Corp.**'s forthcoming Enterprise Messaging Server (EMS), **Optus Software, Inc.** in Somerset, N.J., will announce this week a Windows NT-based fax server that can integrate with other EMS applications, such as electronic mail. Microsoft said it will officially launch EMS at its annual messaging user conference that begins June 20. EMS is the next generation of Microsoft's Mail.

SHORT TAKES Automaker **Saturn Corp.** in Troy, Mich., has started an interactive marketing program on the Prodigy on-line service to reach Saturn customers and prospects.... **Computer Associates International, Inc.** has been granted early termination of the "waiting period" for its pending acquisition of **The ASK Group, Inc.** Meanwhile, a federal jury last week dismissed allegations made in a stockholder class-action suit that charged CA and its officers with federal securities fraud.... **Platinum Software Corp.** last week said it has settled a shareholder class-action lawsuit for $17 million in cash and debentures.

Taligent to unveil OS code

Beta version said to include 80 object-oriented frameworks

By Ed Scannell

■ Taligent, Inc. will release this week the first code of its long-awaited operating system, which should let corporate and third-party developers take their first steps toward developing object-oriented applications and components across a broad range of software platforms.

About a week ago, Taligent also shipped similar Taligent Application Environment (TAE) code it owed to its principle investors: IBM, Apple Computer, Inc. and Hewlett-Packard Co. They will incorporate Taligent's first series of frameworks or code into their operating systems during the course of this year.

"After all the table-setting that has been done [by Taligent], it will be interesting to see what they actually put on the plate," said John Handy, an information systems manager at a large chemical company in Gaithersberg, Md. "It will be interesting to see what shape this stuff is in and how soon we can be productive with it."

This "pre-beta" version of TAE will be distributed to about 100 developers as part of the company's Partners Early Experience Kit, or PEEK, which will be announced at a two-day developer's briefing in the San Francisco area this week.

The beta version consists of 80 object-oriented frameworks for developers to use in existing applications — or to create new ones — with features such as three-dimensional graphics, advanced multimedia capabilities or the ability to create compound documents.

The two most crucial goals of the beta test are to find out what features developers want added or removed and to document evidence about what real-world problems Taligent hopes to solve. A second beta version incorporating suggested changes could ship in the early fall, Taligent officials said.

Developers will also get their first chance to work with a preliminary version of the operating system's "People, Places and Things" object-oriented interface.

This first set of frameworks will be followed by a second set late this year or early next year. Joe Guglielmi, Taligent's chairman and chief executive officer, said the finished shrink-wrapped version of the operating system is still on schedule for the middle of next year.

Developers encouraged

While developers said they harbor no illusions about creating fully exploitive applications with this first cut of the code, they are encouraged by Taligent's progress.

"We'll be able to do a fair amount of prototyping, which sets the stage for doing a full-blown application. We can build bits and pieces [that] we can snap in to the frameworks," said Randell Flint, president of OS/2 developer Sundial Systems Corp. in Seal Beach, Calif.

Company officials will demonstrate for the first time at this week's conference the TAE running on top of Microsoft Corp.'s Windows NT, which some see as a preemptive strike against the still unshipped Cairo. Taligent officials said they have incorporated their technology into Windows NT without cooperation from Microsoft, which will directly compete against Taligent with Cairo, its own object-oriented operating system that is expected late next year.

"We can start work on NT without Microsoft's help because we don't have to dribble the frameworks through Windows and all of its event handlers," Guglielmi said.

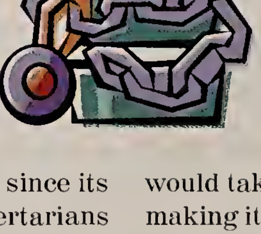
Clipper chip flaws debated

Encryption technique could be used to thwart law enforcement

By Gary H. Anthes

A computer scientist at AT&T Bell Laboratories has reported finding several flaws in the technology underlying the federal government's controversial proposal for enabling law enforcers to wiretap encrypted communications. However, cryptography experts said the flaws are not showstoppers.

In a draft paper circulated to a few experts for comment, Matthew Blaze detailed ways that the so-called "key-escrow encryption" technique — often referred to as "Clipper" — could be adapted to thwart the government's ability to unscramble protected communications. One method would generate a fake "law enforcement access field" that would block the government's ability to retrieve the correct decryption key.



Clipper has met with a storm of criticism since its introduction 13 months ago, with civil libertarians saying it opens the door to government snooping and pragmatists saying the idea is silly because criminals will not use Clipper devices anyway.

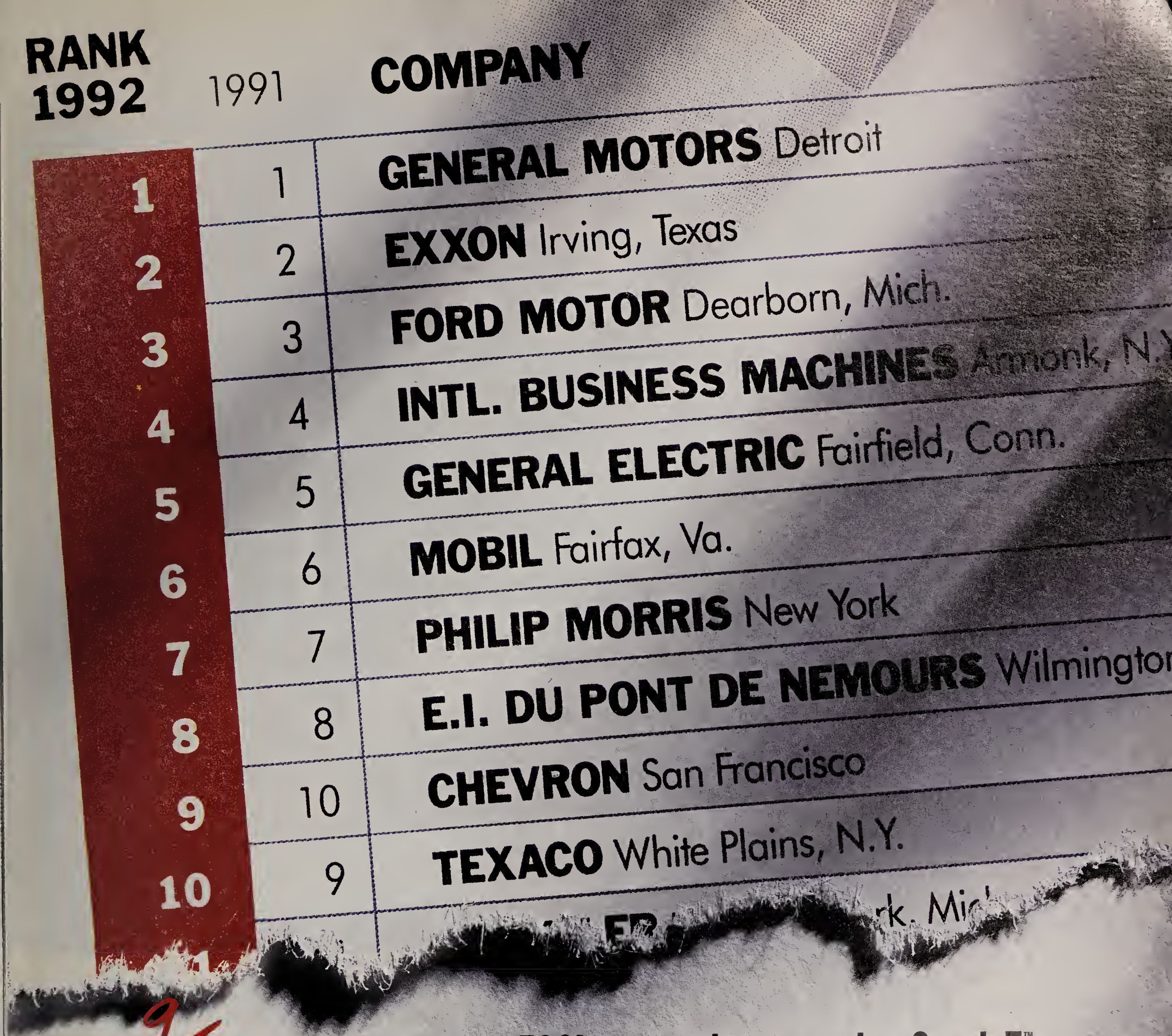
Last week, cryptography experts said that although Blaze's work is sound, the techniques he described are impractical in most cases because they are difficult to set up and computationally inefficient. They are also geared for computer applications such as electronic mail and file transfers, not voice, fax or low-speed data telephone applications, for which the key-escrow technology is primarily intended.

The technology in question is based on the "Skipjack" algorithm developed by the National Security Agency for encrypting sensitive but unclassified communications. Skipjack is embedded in either the Clipper chip or Capstone and uses two encryption/decryption keys maintained in escrow by separate government agencies. It is subject to use by court order.

Blaze's work involved use of a Tessera card, a PCMCIA card that contains a Capstone chip and X.400 and X.500 functions for secure E-mail.

Stephen Kent, chief scientist for security technology at Bolt Beranek and Newman, Inc. in Cambridge, Mass., said generating the fake law enforcement access field would take nearly half an hour of computation time, making it impractical for real-time communications. "But if you had this one piece of E-mail or this one file that you really didn't want the law enforcement folks to listen in on, it might be worthwhile to buy several Tessera cards and run them in parallel," he said.

Kent noted that government officials have been aware of the security vulnerabilities for some time. Skipjack involves conscious trade-offs between the objectives of law enforcers and factors such as ease of use by legitimate users, he said.



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Novell

CONTINUED FROM COVER 1

tion to communicate. In addition to AppWare Loadable Modules, the ORB will support application modules written to other ORBs, as well as to Component Integration Laboratories' OpenDoc and Microsoft Corp.'s Object Linking and Embedding 2.0, Novell spokesmen said.

AppWare, announced about a year ago, is intended to enable programmers to develop applications simply by connecting prewritten software blocks on a graphical screen using the Visual AppBuilder fifth-generation language. The AppWare Foundation then allows applications written to its interfaces to be automatically ported across a variety of client environments.

While AppWare 1.0's ship date has now slipped from last month to later this month or early July, developers and beta users said the initial tools are reasonably stable and functional. Early beta user Stonybrook Laboratories, Inc., for example, put some of its Visual AppBuilder plans on hold but only until certain features ship, said Lisa Vaz, manager of application development at the Mobil Oil Corp. subsidiary in Princeton, N.J.

What will make or break Novell's ambitions in the application development arena, however, is the next distributed object-oriented phase of AppWare, said John Rymer, an analyst at Patricia Seybold Group, a Boston consultancy. Novell needs to provide its Visual AppBuilder as a high-level programming tool that shields IS application developers from the underlying complexities of ORB-based programming, he said.

Boston Edison Co. is a likely candidate for such a scheme. An internal AppWare presentation two years ago "really amazed IS programmers in the down-and-dirty Cobol world," in terms of the ease of programming offered by Visual AppBuilder, said John Dubiel, manager of planning and technology at the Massachusetts utility.

Like many companies, Boston Edison is now looking for ways to distribute different pieces of an application across a mixed bag of client and server environments that includes NetWare, Notes and Unix servers. "Novell seems to be tying things together; I hope they are successful," Dubiel said.

Meanwhile...

In the rival camp, Microsoft is preparing a distributed version of its OLE product that is expected to go into beta testing by year's end. One major benefit Novell hopes to offer over Microsoft is the ability to distribute applications over a variety of object models.

Indeed, Novell's ORB will enable users to distribute OLE 2.0-based applications via Novell's ORB — just like Microsoft plans to do with distributed OLE.

Novell's universal ORB will run as a NetWare Loadable Module, and its architecture will comply with the Object Management Group's Common Object Request Broker Architecture (CORBA), Novell spokesmen said.

Novell will also detail an upcoming product that will interconnect AppWare and OLE with OpenDoc, the compound document environment used by Novell acquisition WordPerfect Corp., according to Novell Vice President Joe Firmage.

Partnership possibilities

Novell spokesmen indicated that the vendor will get a jump-start on its universal ORB through third-party vendors. Among the companies with which Novell is in active discussions are IBM with its Distributed SOM product; Expersoft Corp., a San Diego vendor whose CORBA-compliant ORBs run on Unix, Windows and soon will support Microsoft's Windows NT; and Iona Technologies Ltd., a Dublin firm that specializes in interconnecting CORBA and OLE.

Meanwhile, Novell is apparently making progress with at least the initial pieces of its AppWare strategy.

At a meeting of the AppWare Developers Group last week, Novell impressed developers with a demonstration of a beta version of the distributed AppWare 1.1, said Eric Weidl, a software engineer at Parallel Staffing Group in Naperville, Ill., and president of the developers group. Application components developed with Visual AppBuilder and implemented on two Macintoshes "found each other over the network," Weidl said. "People were impressed. It worked."

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Bachman to announce Windows release of Ellipse

By Melinda-Carol Ballou

Attempting to move into the client/server development tools arena by taking advantage of its earlier acquisitions, Bachman Information Systems, Inc. will announce next week a new Windows version of its Bachman/Ellipse development tools, industry sources said.

Bachman acquired Cooperative Solutions, Inc. and its Ellipse tools last fall. Ellipse's client/server development environment previously ran on OS/2 and Unix, offering the ability to build and manage transaction-intensive applications for Windows and OS/2 clients.

Not so good

At the time of the acquisition, Cooperative Solutions was failing financially due to the high price tag of its product and lack of customer interest in higher-end client/server development. Bachman was also fighting losses.

Both companies hoped the acquisition would result in a combined product set that would jump-start a recovery and move them into mainstream usage.

Industry analysts said the Windows release of Ellipse may reach a client/server market more receptive to tools geared for complex, transaction-intensive, higher-end applications [CW, May 30].

A key differentiator from the current crop of lower-end client/server tools is Ellipse's support for features such as application partitioning to optimize performance and transaction rollback and restart in case of system failure. Ellipse is expected to ship by the end of the summer.

This Bachman introduction is the first in a phased release of client/server development products. The firm is also working to integrate its existing base of computer-aided software engineering (CASE) tools with Ellipse.

Links between the products are expected to ship by the end of the year, sources said. This could give Bachman's current user base a transition to client/server.

Windows versions of other Bachman tools are also in the works, and that is good news to some developers.

"We have both Windows and OS/2 systems — half and half — and could be interested in the Windows version of the CASE tools as well as Bachman/Ellipse, depending on how well-integrated they are," said Judy Call, a database analyst at Citizens Insurance Co. of America in Howell, Mich. Her organization already uses the Bachman CASE tools.

"We need to move to client/server and will check out the [Ellipse] tools. But it will depend on the extra cost," she said.

Moving right along

For some former Bachman users, such as Canadian Tire Corp. analyst Stuart Williams in Toronto, the lack of Windows support and the high cost of the Bachman CASE products caused the firm to move to other tools last year.

The Ellipse development environment on Windows is expected to be priced at $3,500, sources said, and pricing for the Ellipse repository will start at $15,000. Company officials declined to comment on the tools.

All the parts

Bachman/Ellipse consists of three components: the client, database server (running Sybase, Inc.'s relational database) and the application server.

Spending trends

IS pumps up LAN spending

By Suruchi Mohan

Information systems spending on LANs vs. mainframe environments continues its steady climb in favor of LANs and desktop systems, according to a study of 100 California companies released last week.

"The trends keep repeating themselves: Companies spend less on mainframes and more on LANs," said Walter Ulrich, a director at Arthur D. Little, Inc. in Los Angeles and one of the authors of the study.

The management consulting firm, which is based in Cambridge, Mass., found in its survey that from 1993 to 1994 the following occurred:

- Fifty-seven percent of IS shops increased their budgets, down slightly from 60% last year. On the other hand, only 37% of the companies polled showed a decrease in IS spending.
- Fifty-five percent cut back on mainframe expenditures, while only 23% increased them and 22% remained stable.
- About 71% of the companies increased LAN expenditures, while only 4% decreased them.

The increase in IS budgets can be attributed to the recovering economy, Ulrich said. "When we did this survey in the beginning of '92, more companies were decreasing than increasing" their budgets, he said. "The economy makes a difference. As far as IS is concerned, the economy has improved so they are making the investment."

While these figures seem representative of the market, they do not tell the whole story, according to Sateesh Lele, senior vice president and chief information officer at Telogy, Inc., an equipment testing company in Redwood City, Calif.

The user pays

A big chunk of the costs is passed on to the user community, Lele said. Also, hardware costs, which the survey captures, constitute only a fraction of what organizations have to spend.

"If you see only the IS costs, you don't see user costs such as training and software. [Without user costs, the figures] do not represent the total cost of migration to client/server," Lele said.

The growth figures for IS budgets could also be deceptive because the first two to three years of migration involve more expense. Once the new environment is in place, IS budgets drop about 12% to 15%.

Although the study took place in California, both Ulrich and Lele said they believe it indicates a national trend.

Client/server pricing

CONTINUED FROM COVER 1

sites. Observers said vendors are looking to provide more value-based models and focus more on actual usage and disregard servers and sites.

Another option is to determine new definitions for a software's value, said Warren Culpepper, president of Culpepper and Associates in Atlanta, which tracks software licensing issues. With such new definitions, he said, hospitals could be charged by number of beds, or insurance companies could be charged by the total of their premiums.

Unscrambling the puzzle

For their part, users mainly want simplification. Information systems executives said they want more standardization, fixed pricing and easier-to-manage pricing models.

"It's been a complicated area, certainly with D&B Software, because they are moving from a mainframe pricing mentality to something totally new and different," said Doug Gosling, manager of financial systems at Ontario Hydro in Toronto. "As a buyer, my preference is to sit down, look at what we want, tell them what help we need and wrap it up in one package. If I have an idea of a fixed price, I know exactly what I am going to get."

Several other client/server software providers contacted last week — such as PeopleSoft, Inc., SQL Financials, Four-Gen Software, Inc. and IMRS, Inc. — said they are continuing to look for ways to make pricing more straightforward.

James Matsey, corporate director of IS at Reynolds Metals Co., was a longtime and vocal critic of tiered pricing, which has been a mainstay of the large systems industry. Today, Matsey is overseeing a beta project with a client/server financial application from Walker Interactive Systems, Inc.

"From what I have seen, client/server vendors are making a valiant attempt to price based on value," he said.

"Most vendors still don't know how to price for the client/server environment," added Jack Spurgeon, a vice president and director of the Systems and Computer Services Division at Eastman Chemical Co. in Kingsport, Tenn., which uses SAP's mainframe and client/server software. "If you can't negotiate, you can pay through the nose."

A little fine-tuning

Vendors are indeed looking for ways to fine-tune their programs in an industry where "there is no rule book," Culpepper said. He and other observers said client/server pricing is difficult because the industry itself is new, so common practices have not yet developed.

D&B Software, for example, currently prices packages for its Smartstream client/server applications with a few key criteria: a base platform price, software module prices, number of servers and number of users. While it sounds straightforward, the pricing can quickly spiral beyond simple math as a user expands the system.

Per-user pricing is subject to various percentage discounts, and additional server prices vary depending on use. Software module prices can change, too, depending on the number purchased. Customers can also roll in credits for D&B Software's mainframe software functions.

"We have fairly complex pricing algorithms," said Kirk Reiss, vice president of customer service strategy at D&B Software. "Our customers say it is just too complex."

Still, D&B Software's pricing is not unusual in terms of the number of elements that can be factored into the final price. PeopleSoft, for example, includes the size of a customer's business, the type of server and the number of workstations at the site.

For its pricing, SAP America starts with basic criteria similar to D&B Software's and bases cost on number of servers and number of users. It adds optional fixed costs for the SAP data model and scales the price up as the number of users increases. Company President Klaus Besier said SAP America hopes to ease the administrative burden for users. "If you have to go through that many definitions — what is an active user, what is a designated unit, a runtime license, a development license — it just goes on and on," he said.

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Pentium prevails at desktop show

Taiwan's Computex trade show highlights new wave of notebook computers

By Michael Fitzgerald
TAIPEI, TAIWAN

Intel Corp. Pentium-based notebooks and dual-Pentium desktops were popping up all over the place at the Computex computer trade show held here last week. Among the hundreds of products on display, these Pentium systems looked to be the most likely candidates to enter the U.S. market this year.

Computex gives vendors from around the world an opportunity to find new technologies to bring to market. While many of the innovations seen here never actually reach the market, a significant percentage do.

Taiwan is the No. 2 provider of notebooks in the world, having shipped 1.2 million units in 1993.

Despite the presence of high-end-caliber notebooks from low-priced Taiwanese vendors, analysts and vendors said users should not expect significant price drops this year.

Bruce Stephen, an analyst at International Data Corp. in Framingham, Mass., said continued shortages of active-matrix color displays and the high initial prices of Pentium systems will keep notebook prices relatively stable through year's end.

What's up ahead

From indications at the show, U.S. customers can expect the following products and trends to emerge later this year:

- Numerous notebooks based on the DX4 25/75-MHz and 33/100-MHz processors from Intel.
- Highly modular notebooks with removable hard drives, floppy drives and batteries — bringing high-end features to lower-end notebooks.
- Built-in infrared communications.
- A variety of new subnotebook designs, including some with built-in multimedia features.

One vendor displaying a new notebook was Compal Electronics, Inc., which showed off its TS30 PC, a notebook powered by a 60/90-MHz Pentium processor. The 6-pound notebook has a 10.3-in., dual-scan, passive-matrix color screen; Peripheral Component Interconnect (PCI) bus; built-in stereo sound and PCI local-bus video.

David W. Shen, engineering vice president at Compal, said the company expects to deliver both this box and another based on an unannounced 3.3V 75-MHz Pentium processor in September. Base models will start at $4,000 and will be sold through low-end vendors in the U.S., Shen added.

Lean on me

Among the major U.S. vendors that rely on Taiwanese companies as OEMs are Apple Computer, Inc., AT&T Corp., Dell Computer Corp. and AST Research, Inc.

Another Pentium system to make its debut hailed from Twinhead International Corp., which is now shipping the Slimnote 586, which uses either a 60- or 66-MHz Pentium chip. Company officials declined to name possible U.S. OEMs, however, or suggest prices for the 7-pound notebook.

Meanwhile, The Acer Group, by far the largest Taiwanese PC maker, showed the Acer Altos 9000 dual-Pentium system. Designed to be configured as either a high-end workstation-class desktop or a server, it uses the 66/100-MHz Pentium chip.

Simon Lin, Acer's president of computer products, said Acer does not expect to bring this product to market until next year.

Also on display at the show were motherboards that support PCI, Video Electronics Standards Association and AT bus simultaneously and also support Intel-compatible processors from Cyrix Corp. and Advanced Micro Devices, Inc.

Borland slide accelerates

CONTINUED FROM COVER 1

this month. Borland Chief Operating Officer Keith Maib said last week Borland would ship dBase for Windows by July 31.

"If dBase is out for a good part of the second quarter, they should be profitable for that period. But what next?" asked Michael Wallace, an analyst at UBS Securities, a Wall Street brokerage. "With the financial situation they are in, I don't know if they have the money to go head-to-head with any of their competitors."

And that may make it difficult for Borland to work hand in hand with large information systems shops.

Borland's Philippe Kahn *admits it was a 'tough quarter'*

The real gripe for IS

Users do not call into question Borland's technology. Nor do they raise much dust about the company's new upsizing strategy, which was launched earlier this year when Borland sold its Quattro Pro spreadsheet line to Novell, Inc. With its remaining database, languages and tools, Borland is trying to reposition itself as a provider of products that will help IS upsize PC LAN applications into the higher-level client/server realm.

"There are definitely companies out there that are upsizing," said Nicole Roth, an analyst at International Data Corp. in Framingham, Mass. "Since Borland has a lot of the components needed for upsizing, this is a sound strategy for them that makes a lot of sense. The problem with Borland has always been implementing their strategy."

What does unnerve IS professionals is wondering whether Borland can execute a strategy that will provide them with solid products on a reliable basis — something Borland has not delivered on since its acquisition of Ashton-Tate Corp. in 1991. And its current fiscal woes do little to ease this concern.

"I'm not sure they can do anything to restore my confidence," said Lorraine Junge, a senior technician responsible for PC software planning and acquisition at Aerospace Corp. in El Segundo, Calif.

"Without finances, how will they do a recovery?

"I don't get panicky," Junge said. "But if I see the water get cut off, I will have to make recommendations and look to a fallback position."

Borland's financial problems do indeed constitute a large negative that IS must now contend with, said Donald A. DePalma, an analyst at Forrester Research, Inc. in Cambridge, Mass.

He said a Forrester survey conducted earlier this year found that a vendor's viability, stability and credibility were among the top criteria IS uses to gauge whether it wants to enter into a business relationship.

A half-dozen IS officials interviewed confirmed Forrester's findings.

"I consider it extremely important," said Theresa Doyle, vice president of systems at Nationar, a banking concern in Woodbury, N.Y. "I read what stock analysts say, read earnings reports and have even run [Dun & Bradstreet] financial ratings on smaller companies that I've considered."

Ironically, if Borland were perceived as a simple desktop application product vendor, its financial position would not be viewed with as much alarm by IS, users and analysts agreed. But as the company now focuses on tools, languages and databases to streamline its business — and pushes a client/server upsizing strategy at IS — it will be judged by different criteria.

"It then involves your data and services," said Leo Heile, vice president and chief information officer at ITT Corp. in New York. "They could quit product support or product development."

Money equals security

Rather than watch a vendor such as Borland go through a long, painful decline, users would rather know that the product line will continue and that their data will stay intact, Heile said.

"You want a vendor with money behind them," he added.

Maib said Borland must regain its credibility with the market and IS through its performance. "We have to deliver," he acknowledged. "That is the most important thing going forward."

Time will tell. In addition to the loss expected for the first fiscal quarter of 1995, Borland officials last week could not promise analysts that the vendor would return to profitability in its second quarter either.

Moreover, should Borland and Lotus Development Corp. fail to settle their lawsuit out of court, Borland could face a hefty damages judgment in October — the third quarter — as well.

Uniface, Gupta announce tool kit upgrades. See page 75.

Borland plugs new technologies, seeks to spark revenue

At the Borland user conference in Orlando, Fla., this week, the company will demonstrate technologies — some unannounced — that officials said they hope will help bolster the company's sagging fortunes.

One key to Borland's strategy is a new application development environment, currently called Delphi 95, which will offer visual tools, a compiler and scalable database capabilities to support more complex, higher-end client/server development, internal company sources said.

The product is expected to ship by year's end, they added.

Industry analysts, however, said that unless the tool scales up well beyond what is currently available in the overly crowded market occupied by products such as Powersoft Corp.'s PowerBuilder, Borland will have difficulty making a dent.

Borland is also expected to demonstrate its C++ compiler and development environment running on Microsoft Corp.'s Windows NT; an Alpha version of support for Novell, Inc.'s AppWare; and support for Microsoft's Object Linking and Embedding 2.0 and for DOS executables.

—Melinda-Carol Ballou

Lotus seeks IS

CONTINUED FROM PAGE 2

Lotus' communications products, Notes and CC:Mail, represent slightly less than 30% of the company's total revenue.

The one market where Lotus clearly dominates is Notes, which just became profitable in the last year. At the same time, Manzi said Notes has penetrated only 2% of the potential size of the workflow market.

These statistics are not lost on Lotus' competitors. Noting that Notes has done well in penetrating the high end of the groupware market, Mark Caulkins, vice president of corporate and strategic marketing at WordPerfect, said a potential Novell/WordPerfect offering is positioned to carve out the broad, lower end of the market. "Notes is weak in the area of networkable applications such as messaging and calendaring," he said. "When you look at things like information sharing and bulletin boards, we don't see any reason why we can't grab a good chunk of this market."

Jim Manzi of Lotus: *There's still work to be done*

WordPerfect and Novell have technological and marketing strengths that Lotus admires. Lotus tried but failed last year to acquire WordPerfect, which has one of the strongest word processing applications in the industry.

And while Lotus dominates the groupware market with Notes today, it has been in that position before with its 1-2-3 spreadsheet. That position was overtaken by Microsoft beginning in 1990, when Lotus declined to develop for Windows 3.0 (see chart page 2) and chose OS/2 instead. The result: the loss of 1 million 1-2-3 spreadsheet users to Microsoft.

Decisions, decisions

Today, Lotus faces strategic platform decisions again. It recently had to make what one senior executive called a "painful choice" regarding the Macintosh desktop application market. After rolling out a 1-2-3 product for the Macintosh, Lotus opted to yield the market to Microsoft, which owns the lion's share.

This choice may come back to haunt it, analysts said. Since Lotus must compete against Microsoft by offering a stronger cross-platform strategy with its application suites, dropping Macintosh support hurts that strategy, Marshak said.

Even if Lotus was not making money in the Macintosh market by providing Macintosh applications, it made business applications that could run on both Intel Corp. and Macintosh boxes.

However, Lotus is not dropping its support for OS/2 applications — a market that Microsoft abandoned long ago. The 4-million-strong OS/2 desktop market is nearly equal in size to the Macintosh application market, said Carter Lusher, a manager of the PC software program at Gartner Group, Inc., a consultancy in Stamford, Conn.

"Our recommendation to users is to pick your [application suite] vendor based on the smaller part of your user base," Lusher said. "If it's Mac, go Microsoft. If it's OS/2, go Lotus."

Analysts expressed concern that Lotus will follow through on its public statements regarding development for Microsoft's Windows 4.0 (Chicago), expected out sometime next year. At the annual meeting, Manzi said Lotus would deliver applications for Chicago when the operating system was stable. Lotus executives expect "stability" around six months after the initial Chicago ship.

Analysts said Lotus does not have the luxury to wait and see, nor can it afford to repeat an earlier mistake of snubbing Windows 3.0. Not shipping its desktop applications when Chicago ships could be more costly to Lotus in market opportunity, market share and perception than when Lotus underestimated the Windows 3.0 market in 1990.

"Lotus is already getting waxed by Microsoft in sheer numbers," Lusher said. At a run rate of an expected 2 million-plus copies of Windows 4.0 per month, he said, Lotus cannot afford to lose more market share to Microsoft applications.

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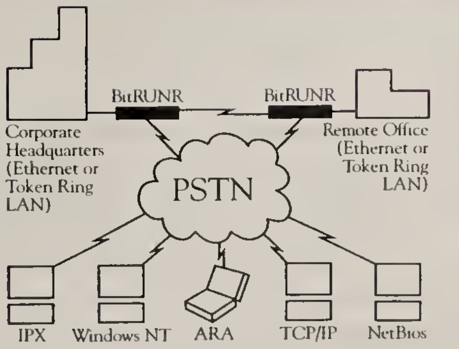
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Network management

HP to enhance OpenView

By Steve Moore

Hewlett-Packard Co. is expected next week to announce enhancements to the OpenView family of network management tools, covering software distribution, network print administration, storage management and backup capabilities.

A source close to the company confirmed that the OpenView Software Distributor will now support PCs as well as Unix systems. In addition, significant enhancements have been made to the OmniStorage hierarchical storage manager, the OmniBack storage backup software and the OpenSpool network print administration software, the source said.

"It's not a super-duper complete overhaul of OpenView," said Mary Johnston Turner, a principal consultant at Northeast Consulting Resources, Inc. in Boston. "The storage and backup stuff all comes out of a group in HP's operations center in Germany, and it's still not clear how fully integrated everything is."

Users reacted positively to the forthcoming OpenView enhancements, especially in the area of software distribution. But they are also looking for additional enhancements.

"We're interested in finding better tools to do fault isolation with OpenView, right down to the client PC," said Rolen Yoshinaga, director of MIS for the state of Utah in Salt Lake City. "Right now, it monitors to any of the devices that can create the SNMP agent, which could include routers and hubs and Novell file servers and client PCs, and you can at least ping those PCs and see if they're active."

But Yoshinaga said the state would like OpenView to include an integrated ability to "actually get into a LAN segment and identify traffic collision rates and those sorts of things."

The OpenView enhancements will be announced first in Europe next week, with a U.S. announcement the following week.

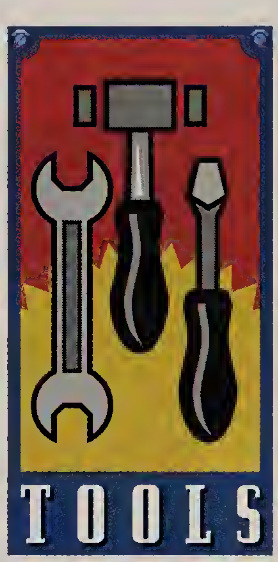
Notes VIP closes in on ship date

By Lynda Radosevich

Lotus Development Corp. said last week that it is on target for delivery this month of its Notes VIP visual programming tool for developing Notes applications.

Notes VIP is add-on software designed to address difficulties in building Notes applications such as linking to production databases and developing attractive user interfaces via the complex Notes application programming interfaces (API). Key VIP capabilities include the following:

- Querying and updating the major relational databases.
- Visual, object-oriented programming capabilities.
- Reporting and charting functions.
- End-user interface development tools.
- Visual development tools that enable programmers to use drag-and-drop methods to connect objects such as database records and documents.



Notes developers have been asking Lotus for better development tools for some time.

"I'd like to have more [computer-aided software engineering] tools and faster access to the procedure language that you build under Notes," said Tony Salvati, president of Mercantile Technologies, a Notes site and a holding company for Mercantile Bancorp in St. Louis.

Initially, VIP will be packaged and sold separately from Notes, sources said. Lotus may wrap it into Notes 4.0, but that version's delivery has already slipped from the end of the year to the first half of 1995. Pricing for VIP will be announced when it ships, Lotus said.

Jeff Inkler, a Notes system engineer at Frederick Computers Plus in Frederick, Md., tested a beta copy of VIP and praised its ability to help developers abstract forms from the rest of Notes. "Visually, it's very pleasant. You can have it so that it doesn't even look like a Notes desktop," Inkler said.

There are other products that let developers port SQL and other database information to Notes applications. They include Powersoft Corp.'s PowerBuilder, Microsoft Corp.'s Visual Basic, Brainstorm Technologies, Inc.'s SQL Link and Edge Research, Inc.'s Hi-Test API for Lotus' Notes.

But these packages are not as well-integrated with Notes, said David Marshak, an analyst at the Patricia Seybold Group in Boston.

NetWare group broadens vision

By Elisabeth Horwitt

The Certified NetWare Engineer Professional Association renamed itself last week and announced initiatives aimed at expanding the job horizons of its 6,500 members and eliminating redundant certification training costs.

Now called the Network Professional Association, the Provo, Utah-based organization also rolled out several programs designed to further its members' expertise in a range of network computing technologies.

Perhaps the most significant initiative for the association will be an evaluation of certification programs of key vendors in areas ranging from network operating systems to microcomputers, said Deborah Schmidt, an association board member.

The goal is to identify redundancies across the different programs and eliminate them so that a network administrator certified as DOS-proficient under Banyan Systems, Inc.'s program, for example, does not have to go through another DOS course to be certified under Novell, Inc.'s program.

Berkeley Geddes, association president, said the group is evaluating Banyan, IBM, Lotus Development Corp. and WordPerfect Corp. certification programs. By year's end, the association plans to have drafted a structure for coordinating the various vendor offerings into "a single, full-fledged, multivendor professional certification," he added.

IBM overshoots

CONTINUED FROM COVER 1

tion systems subsidiary of CSX Corp. in Jacksonville, Fla., said he is interested in the parallel technology because of its support for splitting a mainframe into multiple system images and the promise of lower costs. But Sekeley said he "would punt" at the current price levels. "I wouldn't buy mainframe cycles above $20,000" per MIPS, he said.

Tough sell

The $27,000-per-MIPS pricing "is about 25% on the high side," agreed Paul Quade, director of capital planning and resource management at Galileo International, an on-line reservation company in Englewood, Colo.

"I don't think they're going to sell too many of the parallel mainframes for more than $25,000 per MIPS," Quade added. "There's no incentive to buy at that price."

Used mainframes can be had for less than $25,000 per MIPS, he noted, and analysts pointed out that new machines from Hitachi Data Systems Corp. and Amdahl Corp. have also dropped below that level (see chart).

Quade said he expects IBM to push its parallel pricing down into a more palatable $15,000- to $20,000-per-MIPS range "as they get into serious deployment" during the next 12 to 18 months. Later, IBM will have to get under $15,000 per MIPS to compete with used mainframes and high-end Unix systems, he added.

Charlie Burns, research director for large computer strategies at Gartner Group, Inc. in Stamford, Conn., agreed that the parallel systems will have to drop to the $10,000- to $12,000-per-MIPS level by mid-1996. That would likely enable them to compete even with Unix machines "when you consider functionality and not just price," he said.

IBM declined to comment about its pricing strategy last week. The company has not released any list prices on the parallel System/390 machines, which were introduced in April. The key system, the ES/9000 Parallel Transaction Server (PTS), is scheduled to ship this month.

The attempt to protect sales of water-cooled ES/9000s "makes sense from a short-term revenue and profitability standpoint, but I think it would be smarter for IBM to be more aggressive and try to really [encourage] the market" for PTS, Burns said.

"This may be a win-the-battle, lose-the-war kind of situation over the long term," Burns added. "That's the risk they're running."

IBM claimed in briefings with selected analysts that the $27,000-per-MIPS price represents a 20% break over the cost of upgrading water-cooled ES/9000 hardware, which the company put at $35,000 per MIPS. It also said users could save on software costs by going to PTS because it has a less expensive software pricing curve than traditional mainframes, according to Burns and others who were briefed.

Susan Middleton, a senior analyst at International Data Corp. in Framingham, Mass., said customers with ES/9000 Model 952 and below could save up to $20,000 per month on software costs by buying a PTS rather than upgrading to a more powerful water-cooled unit. But users of the ES/9000 Models 972 and 982 would likely see much smaller savings, she added.

IS executives acknowledged that factors other than hardware pricing would have to be included in their evaluations of the parallel machines but said hardware costs remain the primary consideration. "I'm buying hardware," Sekeley noted.

"A lot of people are taking a wait-and-see attitude on client/server for industrial-strength applications because of the questions about it. As soon as that matures, that might impact what IBM is going to do in the future," said Dennis Stufft, senior vice president of MIS at the Pennsylvania Higher Education Assistance Agency in Harrisburg, Pa.

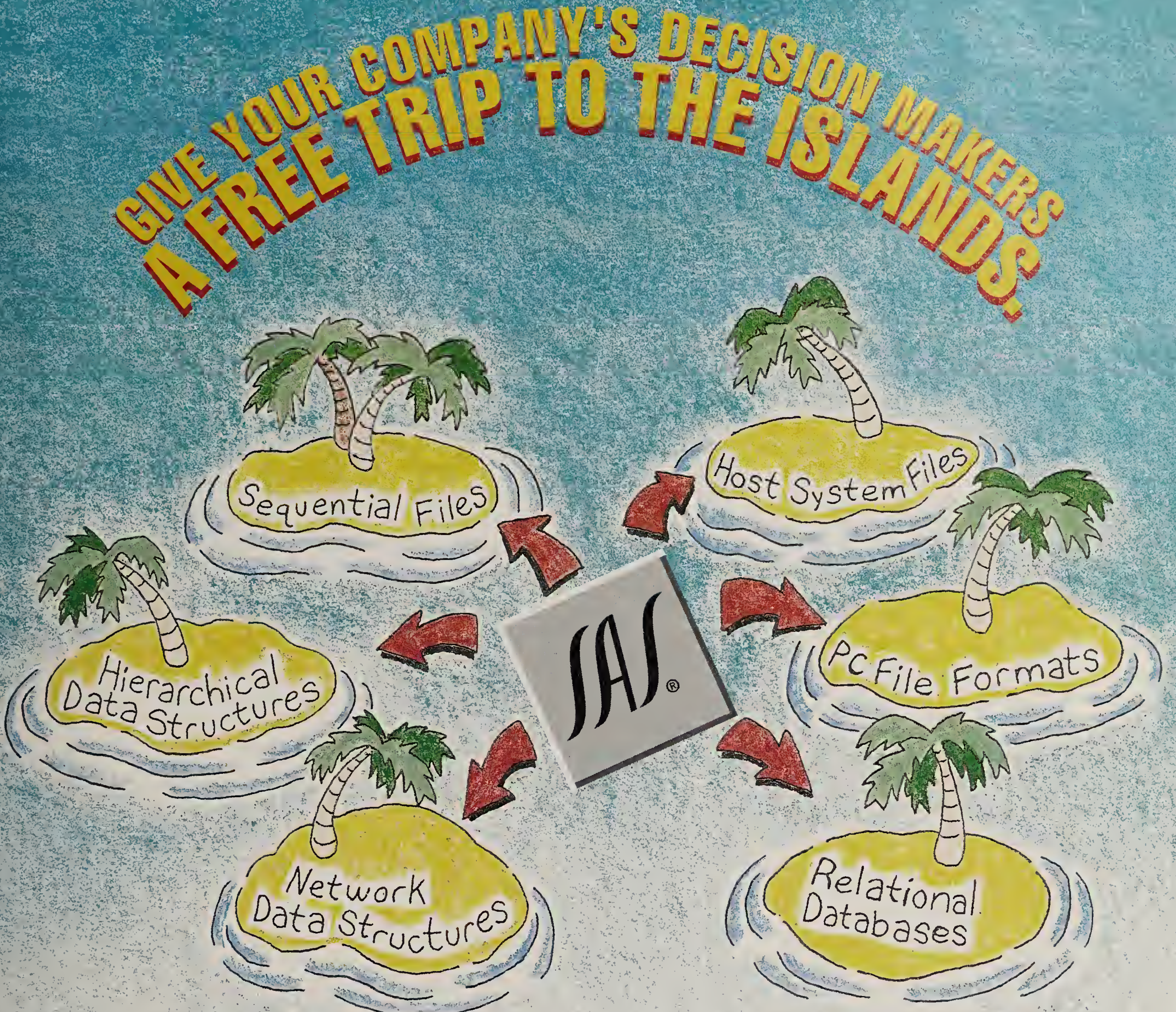
Pricing paradox

WATER-COOLED MAINFRAMES CAN BE PURCHASED FROM PLUG-COMPATIBLE VENDORS FOR LESS THAN THE COST OF IBM'S CMOS-BASED PARALLEL SYSTEM/390 MACHINES

System	Price per MIPS*
IBM ES/9000 982	$30,000
IBM Parallel Transaction Server	$27,000
IBM ES/9000 900 (used)	$25,000
Amdahl 5995/8670M	$23,000
HDS GX8824	$22,500

*Current hardware cost only

Source: International Data Corp., Framingham, Mass.



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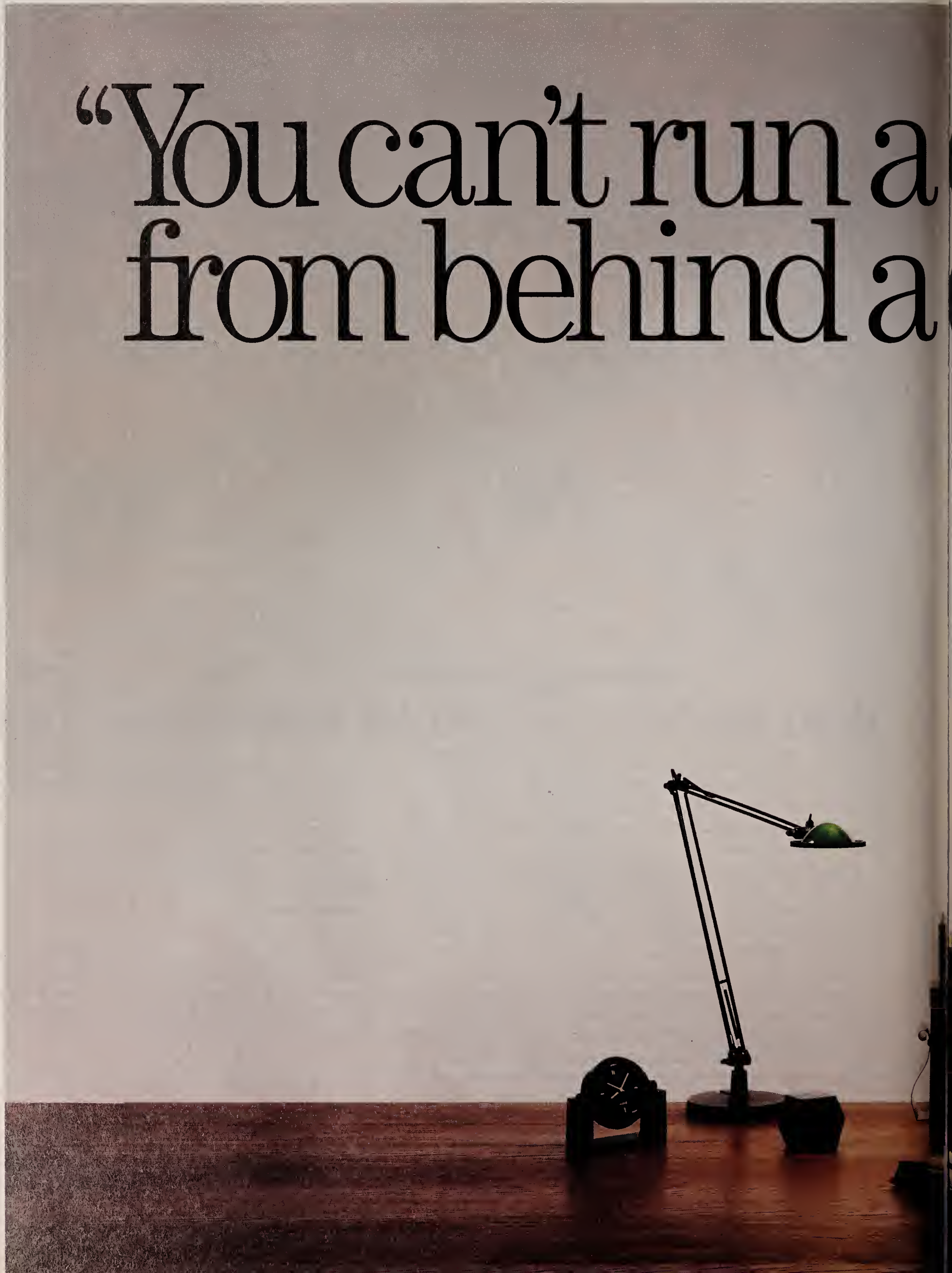

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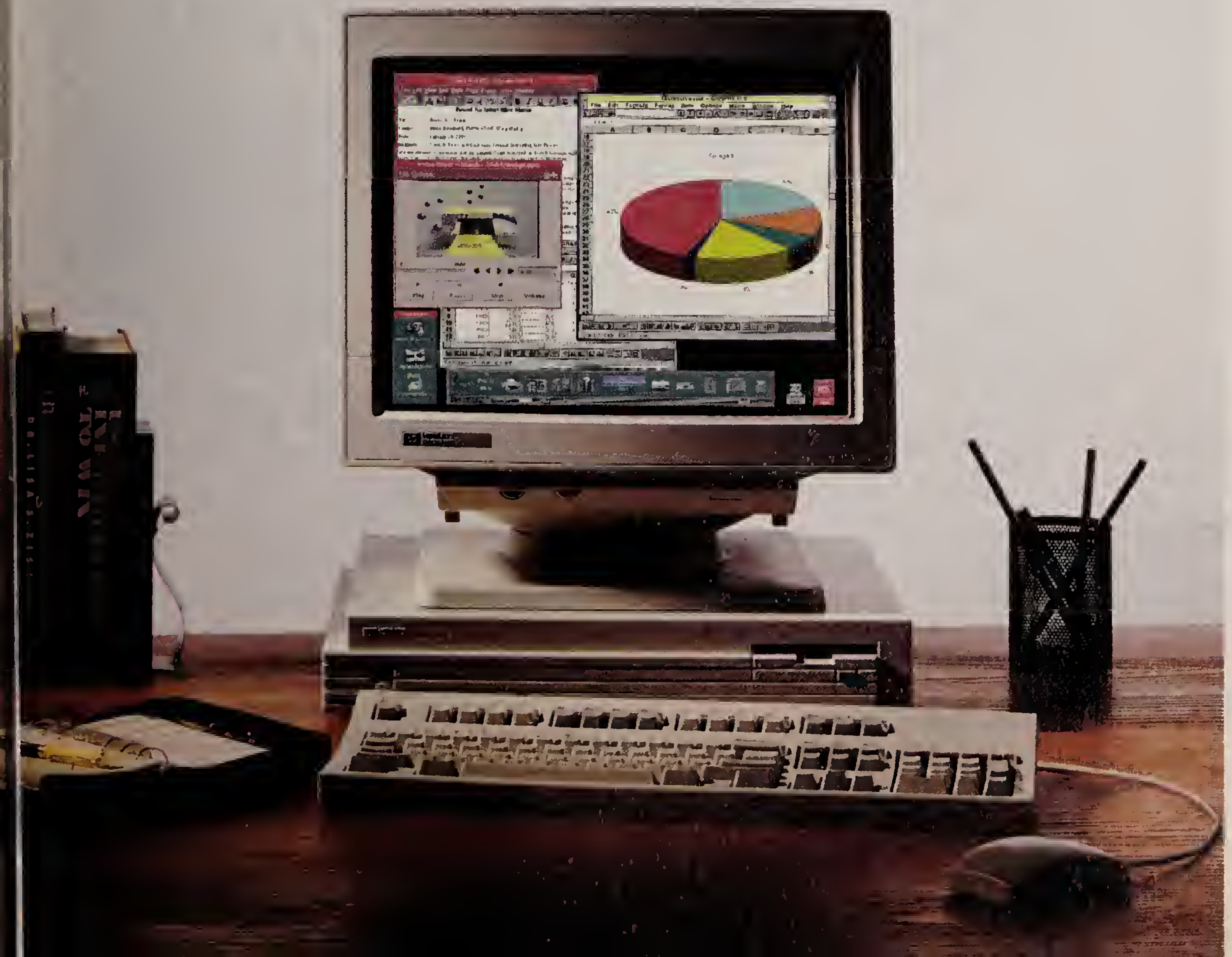

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Informix may best rivals with object-oriented 4GL

By Kim S. Nash

Informix Software, Inc. will roll out an object-oriented, fourth-generation language (4GL) next month at its annual user group conference in Tampa, Fla., a source at the company confirmed last week.

Informix has chatted up the product, whose working moniker is 4GL++, for more than a year while users made do with existing application development tools, including a nonobject 4GL. But if 4GL++ ships on time — plans call for a late July or early August delivery to early users — it will leapfrog offerings from rivals Sybase, Inc. and Oracle Corp., users and analysts said.

Users who have either seen early versions of Informix's 4GL++ or were briefed by the company report the product goes beyond point-and-click interface building to employ a more serious use of object technology.

For example, 4GL++, which will be renamed before it is unveiled next month, will contain an object-oriented debugger, compiler and screen painter, the company insider said. Also, links to rival databases from Oracle, Sybase and others are planned for a second release.

"It's definitely a hot product," said Fred Hubbard, leader of the Northern California Informix Users Group. "4GL++ shows that Informix wants to go beyond GUIs," added Hubbard, who is president of InfoSoft, Inc., a development and consulting firm in Cupertino, Calif.

Meanwhile, Sybase has promised to deliver Build Momentum, a graphical development kit a la Powersoft Corp.'s PowerBuilder, by mid-1995. Oracle recently entered the Windows desktop development field with SQL Forms, a graphical forms generator that shipped early this year.

Neither of those offerings work with other vendors' databases. But neither will the first release of 4GL++.

However, some observers cautioned users not to jump on graphical- or object-based tools without considering whether the targeted application actually benefits from those technologies. Fancy drag-and-drop visual tools can "bog performance right down," said Rick Creson, president of Parallel Technology Solutions, Inc., a database consulting firm in Portland, Ore.

Do not let promotional prices interfere with sound reasoning either, Creson warned. "You can buy the kits for dirt cheap, but you don't save money if you're spending it on [expanding] networking to push all those nice icons or objects around," he added.

Pricing for 4GL++ is not yet set but will likely follow Informix's user-based model, with different prices for development kits and runtime licenses.

The CW Guide to RDBMS. See page 111.

In the works

In an effort to round out operating system choices for Informix-SE and Informix-OnLine users, Steve Sommer, vice president of marketing at Informix, last week revealed the following plans:

- The low-end database, Informix-SE, will be ported to OS/2 and Windows by the fourth quarter.
- Informix-OnLine, mainly a Unix database, will be ported to Microsoft Corp.'s Windows NT this year.
- Hyperscript and Viewpoint, development and query tools, will be ported to Windows, NT, OS/2 and Macintosh. Those versions are due out in stages during the third and fourth quarters.

Informix-SE and Informix-OnLine already run on Novell, Inc.'s NetWare; SE also supports Windows NT via a November 1993 bundling deal with Microsoft [CW, Nov. 8, 1993]. *—Kim S. Nash*

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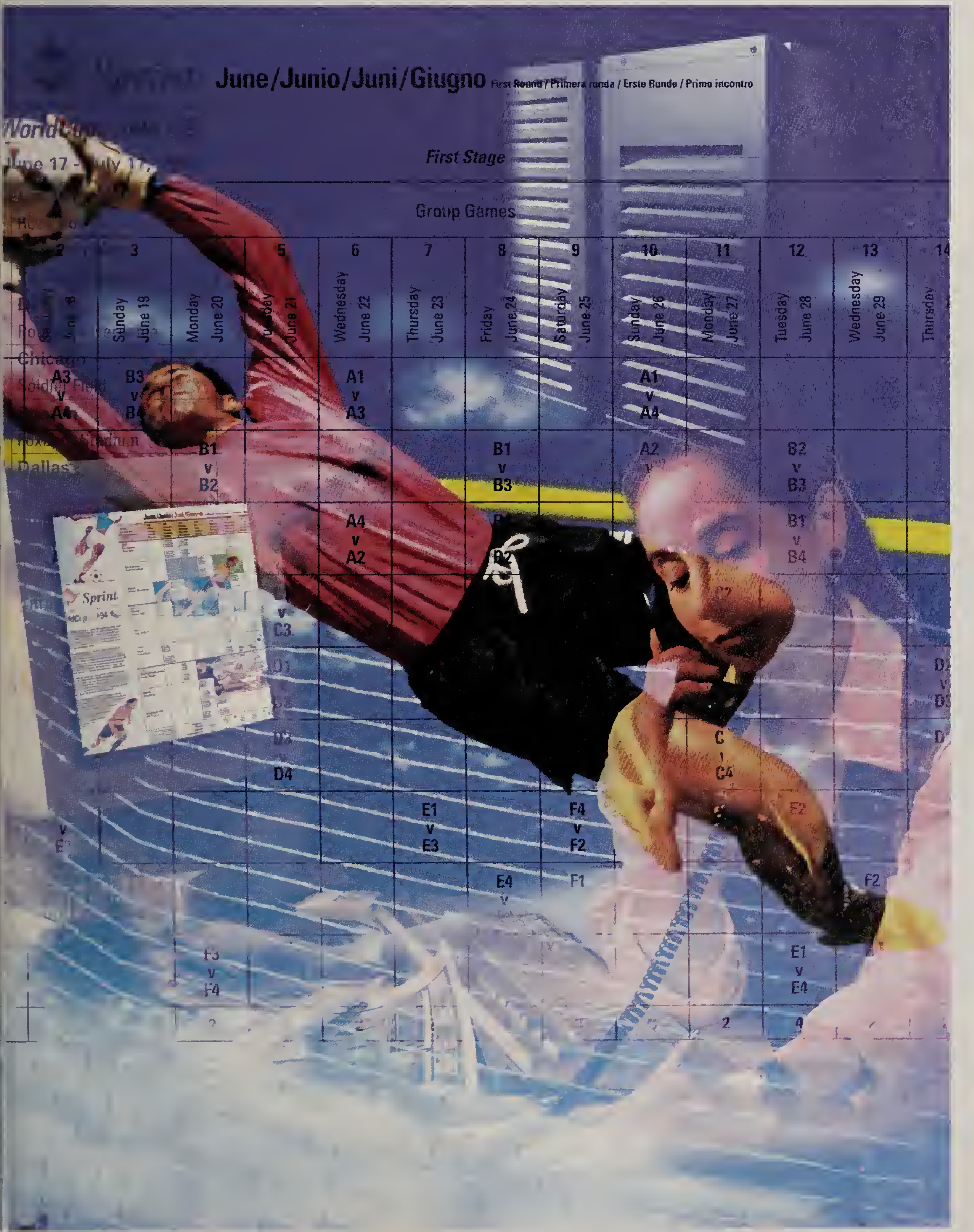

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HP launches systems integration operation

By Mark Halper
PALO ALTO, CALIF.

Recognizing that profit margins will come more from services and less from products, Hewlett-Packard Co. last week formed a systems integration unit vested with profit-and-loss responsibility.

The Solutions Integration Group, headed by HP veteran Michael Leavell, expects to reach $900 million in revenue this year — up from $700 million through scattered operations last year, HP said.

The unit will provide open client/server information consulting and will focus on HP hardware and software customers, Leavell said. It will comprise 4,100 staffers, and another 17,500 employees will provide ongoing customer support through other HP divisions.

Users voiced resounding support for the operation. Several noted that they are implementing changes in their HP architectures and plan to enlist help from the group in their efforts.

Writer's Guild of America West, for instance, is moving its HP 3000-based operations from West Hollywood, Calif., to Los Angeles in about 10 months. The organization will use HP for everything from hauling equipment to the new site to mapping and installing a Novell, Inc. network and configuring an Intel Corp. Pentium-based HP server.

Tom Nefelt *of the Writer's Guild of America West: 'We're going to have HP do all the work'*

"Instead of having several vendors do things for us, we're just going to have HP do all the work," said Tom Nefelt, the guild's data processing manager. "A few years ago, we probably would have had a platinum, certified Novell vendor take care of the network aspect . . . North American [the moving company] move the equipment and an independent cable company lay the wire."

Sam Ellis, vice president of information systems at Portland Community College in Portland, Ore., is using the group to oversee the school's ambitious information superhighway project, which is anchored by an HP 9000 Unix multiuser system.

HP is coordinating the efforts of the college's regional phone carrier, GTE Northwest, Inc., with a number of other companies — including HP — to provide computer, voice messaging and physical remodeling services.

Cheaper prices

HP's services cost less than an independent systems integration firm because while it is performing extensive integration services, it is not taking on as much legal responsibility as independent integrators tend to, Ellis said.

The new group will mark the third time this year that HP has launched a services operation. Last January, it formed an outsourcing unit. Following that, it created a re-engineering operation.

"They're trying to position themselves to participate in the real high-growth market sector," observed John Jones, an analyst at Salomon Brothers, Inc. in San Francisco.

An HP spokeswoman said the vendor had services revenue of about $4 billion in its fiscal year ended Oct. 31, 1993. That included systems integration work as well as ongoing support for customers.

Formation of the new group follows a quarterly financial close at which HP Chairman Lewis Platt voiced concern over the increasingly competitive nature of the hardware and software business, while also noting "excellent demand for consulting services."

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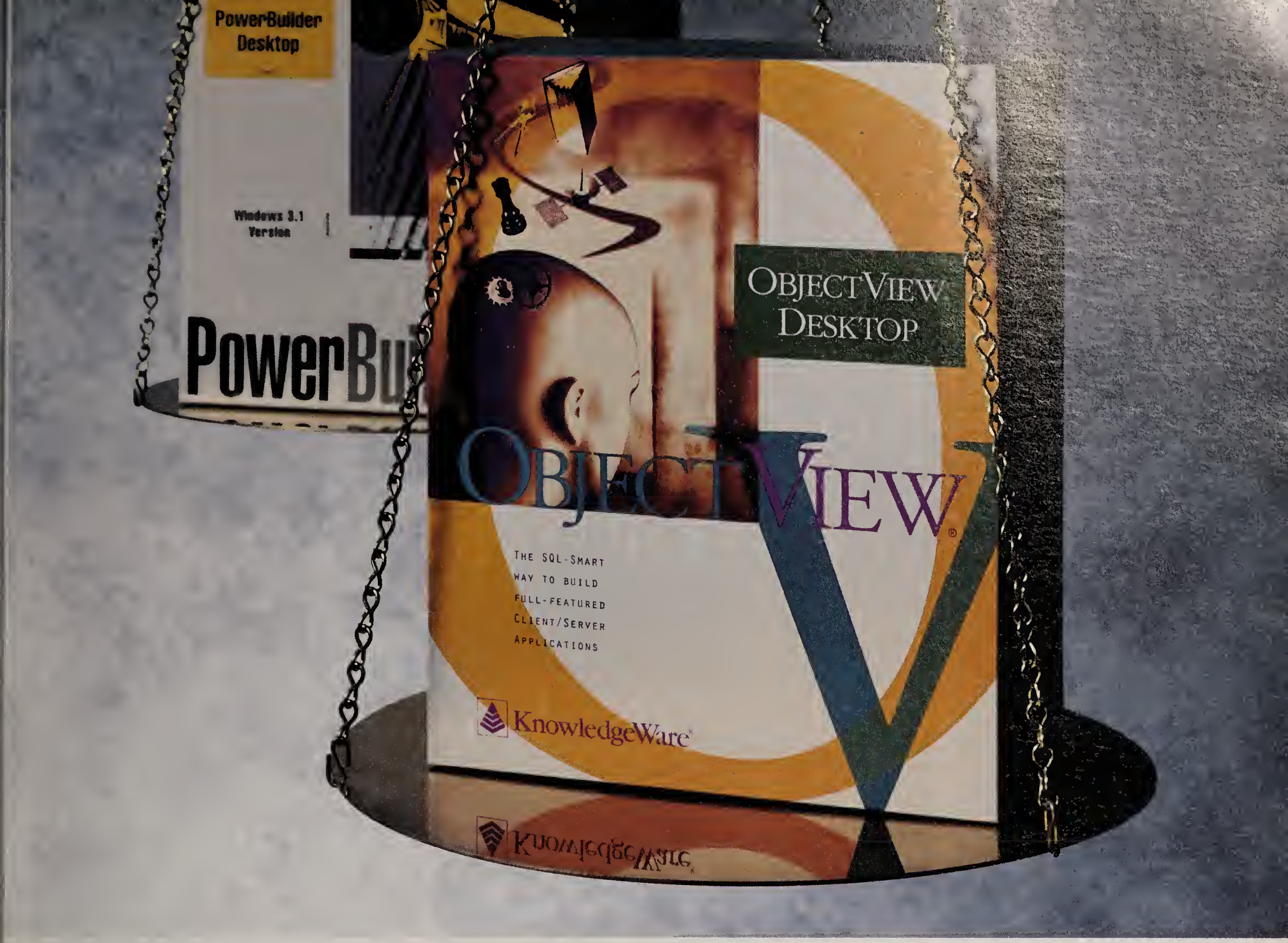

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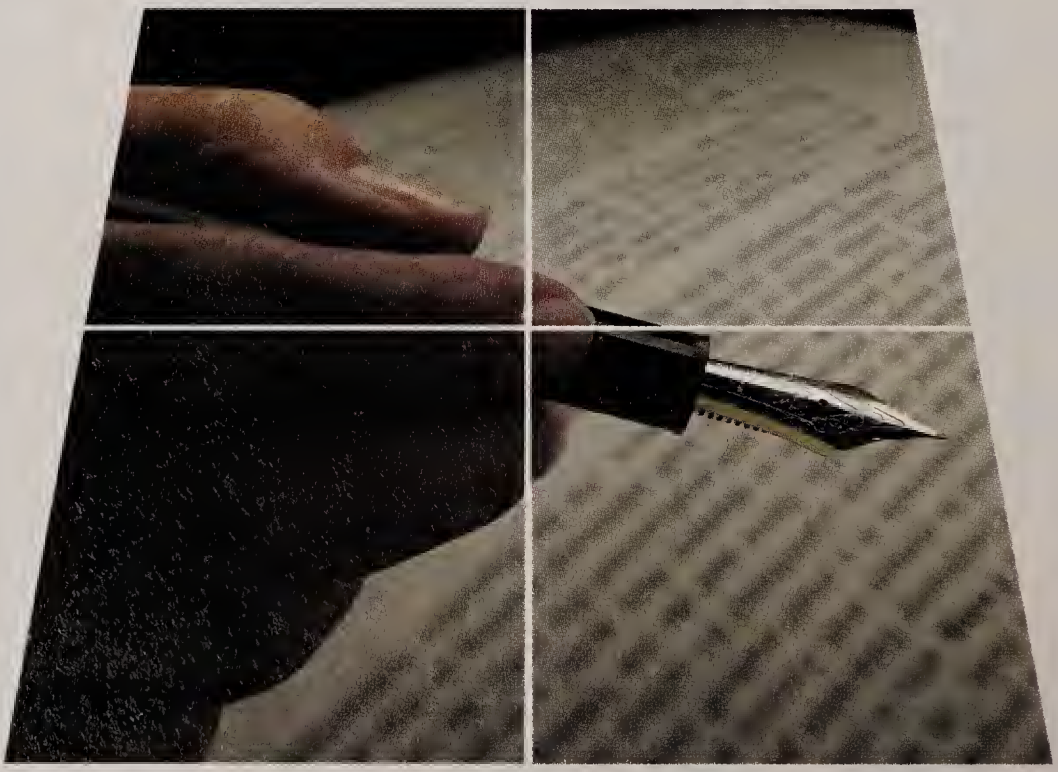

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SMP boosts power but can bite users

By Jean S. Bozman

Fueled by the need for scalable database engines used in commercial applications, the Unix symmetrical multiprocessing (SMP) market is growing at more than 30% a year.

But industry analysts and longtime users of SMP systems warn new users to beware: Unless they pay strict attention to matching work loads to system resources, I/O bottlenecks may idle some of those extra system CPUs.

Without careful tuning, SMP systems can turn around and bite the consumers who paid $100,000 to $700,000 for them, analysts said. "I won't nitpick with anybody that's got a big SMP box out there that's rocking and rolling," said Tom Willmott, a vice president at Aberdeen Group in Boston. "But when it gets to the 14-processor level, it tends to level out."

The leaders in Unix SMP shipments include vendors such as AT&T Global Information Solutions, Sun Microsystems, Inc., Sequent Computer Systems, Inc. and Unisys Corp. Absent from the list is IBM — despite extensive SMP experience from its mainframe line. IBM has struggled with delays in getting its AIX Unix operating system ready to support the multithreaded applications used in SMP machines and will not ship Unix SMP until the summer, IBM officials said [CW, May 30].

Both SMP and uniprocessor Unix systems are made of the same components whether they are built on Unix RISC chips or Intel Corp. Pentiums. Yet where workstations excel at single-user tasks such as graphics processing or engineering design, SMP machines deliver as database servers for commercial applications affecting hundreds of end users.

"We have chosen SMP for what we consider to be the weakest link in our client/server model, which is database expandability," said Gene Friedman, vice president of applied technology at The Chase Manhattan Bank NA in New York. "Within the client/server arena, as you start to move more information to the LAN, you simply need more power."

Chase is installing a global distributed database system based on Sybase, Inc.'s relational database [CW, May 24, 1993].

Easy upgrades

Scaling up existing applications may result in an upgrade-in-place for many SMP machines. "If you stay with a uniprocessor, that box just keeps getting bigger and bigger," Friedman said. "With SMP, you have a plug-and-play environment where you plug in another processor and the operating system will reconfigure [the system] on the fly."

Unfortunately for SMP users, adding the fourth, fifth or eighth CPU to a Unix SMP system may not provide all the power users expect.

"You should get the same performance increment when you add CPU No. 16 as you did when you added CPU No. 2," said Terry Bennett, director of technical systems research at Computer Intelligence/InfoCorp in Beaverton, Ore. "But at some point, the system bus saturates and performance just falls off the table."

Some users of large-scale SMP systems say experience is the best guide for tuning Unix applications (see box above).

"If the different elements of a system are not balanced correctly, it could happen that a job is choking someplace," said Jesus Rodriguez, chief system architect at Fingerhut Cos. in Minnetonka, Minn. Fingerhut uses 16- and 10-way Sun SPARCcenter 2000 SMP servers. The Fingerhut systems are running efficiently now, but sometimes had to be rebooted during the initial start-up phase last fall [CW, Feb. 7].

Bottlenecks can develop at many points in the system, Rodriguez said. If, for example, a system bus is inadequate, "you will never reach the full utilization of your CPUs, and the processes will be waiting in the queue to access memory."

Remedies for failures

If an SMP system fails to smoothly scale up in power as CPUs are added, experts say users should try the following remedies:

- Use more cache memory, which is faster than main memory and much faster than fetching stored data from disk drives.
- Install a bigger system bus because an overloaded one will bring the entire system to a standstill.
- Keep more database tables in main memory to avoid time-consuming I/O operations to disk.
- Evaluate which CPUs are busiest under certain application work loads and adjust those work loads.

IS brain drain

CONTINUED FROM COVER 1

the Society for Information Management. He is also vice president of QED Information Services, Inc., an IS management consulting firm in Wellesley, Mass.

"People are perceiving that for their own future well-being, they need to head in a different direction than their organization," he said.

Reasons for leaving the field vary. Some said they are fed up with the uncertainty that accompanies changing technologies. Others said they sought retraining but were refused help by their former employers.

Looking for stability

Consider the case of Joanne Ward, a 51-year-old senior systems analyst who is opting out of a 30-year IS career with the city of Oakland, Calif. She is leaving her $65,000-a-year job to launch a new mid-life career as a baker specializing in pecan pies.

Ward started out as a Fortran programmer and now develops applications that run on an IBM AS/400 and other midrange systems. With no money for training available from her employer, she said she frequently pays her own way to attend seminars on topics such as client/server computing. In her mind, it is a way to ensure her employment if the city embraces new technologies.

But her employer, a cash-strapped municipal government, has not adopted new technologies, leaving Ward stranded in professional limbo. "I'm trying to keep up in my industry, but I feel it's a losing battle," she said.

Ward could look for a job with a company that offers training and employs newer technologies, but "if you're over 50 or even in your 40s, it's not like other industries will pick you up," she said.

What especially unnerved Ward was not knowing if she would have a job from one day to the next. Eight of her co-workers recently received pink slips, and the city has begun training those still there on how to do more with less.

"There's more peace of mind in taking a cut in pay and giving up not knowing where you stand from one day to the next," she said.

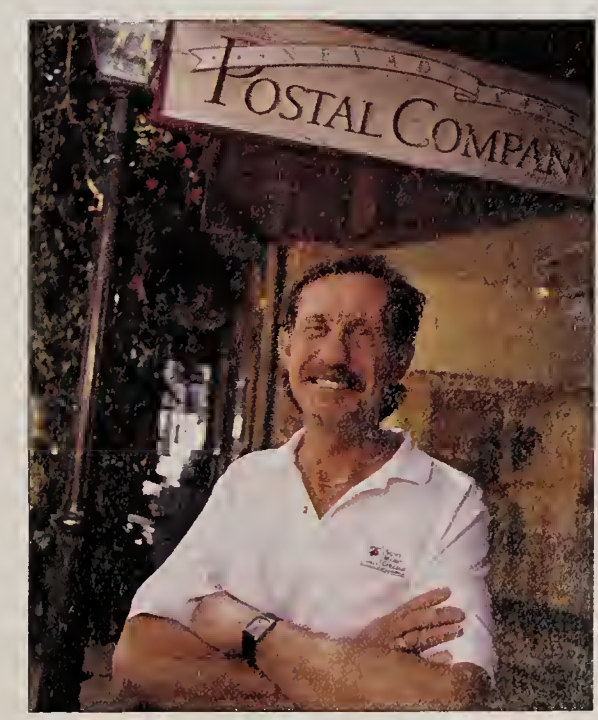
Bob Buhlis, 57, a past president and 22-year member of the San Francisco chapter of the Association for Systems Management, left the IS profession in October 1992.

Laid off from his job in the quality department of Kaiser Permanente Health Plan, Inc., a San Francisco-based health maintenance organization, Buhlis had no interest in retooling his skills to work in today's network-intensive open systems environment. He had spent 25 years as a mainframe programmer/analyst and another six years developing PC applications.

Last November, he moved north and opened the Nevada City Postal Co., a mail box rental business in Nevada City, Calif.

"I was ready to move on to something else. I don't miss it at all," Buhlis said of his 30-year IS career. "Besides, companies don't want old folks with high salaries and lots of experience."

Not true, according to Richard Wonder, national director of information technology recruiting at Robert Half International, Inc. in New York. As of last week, Wonder said he had "at least 100 mainframe openings for people with in-depth mainframe applications knowledge and business acumen."



ANDY FREEBERG

Bob Buhlis, *who now runs a mailbox rental firm, worked in IS for 30 years. 'I don't miss it at all,' he says.*

"There's actually a shortage of very highly skilled mainframe developers that know on-line CICS database skills," he said. "We've also seen an uptick in openings in the last six months, so there are a lot of mainframe jobs again. We have openings in every major urban area in health care, manufacturing, distribution and other industries."

Prospects questionable

Roger O'Connor, who tracks IS employment and compensation at Edward Perlin Associates, Inc., a New York management consulting firm, confirmed that mainframe developer positions are indeed available. But just how long the positions will last is another question. As more companies make the transition to client/server computing, "the window of opportunity in those jobs will be very narrow," O'Connor said.

That is one reason why people such as Jamie Lewis, a former senior systems programmer who now heads his own real estate firm in Greenwich, N.Y., are not bothering to apply.

After accepting a voluntary separation package from his former employer, an Albany, N.Y., publishing firm that is downsizing, Lewis spent two months interviewing for staff positions with 20 different companies throughout the Southeast.

"What I found were companies that would be two years away from where my old company was. They'd be thinking about doing different things with new technology, but they weren't there yet," Lewis said. "To me it was obvious that I would be out of a job again in two years."

It was then, Lewis said, that he decided to get out of corporate information technology for good. Now, he said, "I'm a much happier person, and I have more control over my career destiny."

Briefs

Oracle ups support

Oracle Corp. last week announced a global reorganization of sales, marketing and technical support that has been under way since November. Oracle's separate offices for support and sales in various countries have been unified under four geographic areas. Teams of sales, consulting and support personnel now work together to answer customer questions, rather than force users to deal with different Oracle offices for different needs.

No more French Bull?

This is the last year that France wants to be involved with **Bull Worldwide Information Systems**, according to a company spokesman, who said he would not be surprised to see Bull privatized in the third or fourth quarter of this year. But France still owns approximately 70% — down from previous years — and needs to find other investors. Also holding stakes in Bull are **France Telecom** at 17% and **NEC Corp.** at 4.4%.

DEC goes interactive

Digital Equipment Corp. last week announced a Content Center in Tarrytown, N.Y., to help design, develop and digitize video-on-demand, home-shopping, distance-learning and related applications for consumers. The center, which targets the interactive services market, will also digitize and compress video and audio, test applications in actual networks and train and consult with developers.

SHORT TAKES Newly spun-off securities firm **Lehman Brothers Holdings, Inc.** last week sold its 22% stake in **Computervision Corp.** . . . **Cirrus Logic, Inc.** has agreed to acquire San Jose, Calif.-based **PicoPower Technology, Inc.**, a privately held firm specializing in system power management and advanced core logic for PCs.

Strategic Mapping eyes new road

By Mitch Betts

After digesting two acquisitions, Strategic Mapping, Inc. has outgrown its niche market of stand-alone PC software for geographic specialists. Now the firm is repositioning itself as a supplier of mapping tools that can be embedded in either mainstream corporate applications or shrink-wrapped PC software.

In addition, Strategic Mapping will sell demographic data to plug into those applications. Kathey Hale, a senior analyst at market researcher Dataquest, Inc. in San Jose, Calif., said she is upbeat about the firm's new strategy because "otherwise they would remain stuck in a small pond."

Aggressive changes

Strategic Mapping's transformation began last November when the firm bought Donnelly Marketing Information Services, formerly a unit of The Dun & Bradstreet Corp., which supplies demographic data on consumers for targeted marketing campaigns.

"It looked wild and crazy at the time, buying a larger company in a different line of business," Hale said. "But they began to see the value of selling recurring data — data that gets old and needs renewing."

Charting a new course

Strategic Mapping is expanding beyond the GIS niche, where it is No. 3 on the desktop, and moving into mainstream software markets

TOTAL MARKET REVENUE: $115M

1993 WORLDWIDE GIS PC SOFTWARE MARKET LEADERS

1	Environmental Systems Research Institute	16.1%
2	MapInfo	14%
3	Strategic Mapping	12.2%

All figures are estimates

Source: Daratech, Inc., Cambridge, Mass.

Last month, the geographic information system (GIS) vendor announced it completed a second acquisition of Lowell, Mass.-based TerraLogics, Inc., which provided a key technique for embedding GIS capabilities in others' source code.

With the acquisitions, the privately held firm doubled its size overnight to about $35 million in revenue, a spokeswoman said. In comparison, archrival MapInfo Corp. in Troy, N.Y., last year posted revenue of $18.3 million.

The challenge now for Santa Clara, Calif.-based Strategic Mapping is to bring its new message of enterprisewide mapping to a diverse crowd of information systems managers, vice presidents of sales and marketing and OEMs. It must do this while still selling its flagship Atlas GIS package to power users.

For end users, the strategy shift means they will no longer be limited to pie charts and bar graphs for instant analysis of spreadsheet data. Strategic Mapping disclosed an agreement last month with Lotus Development Corp. to provide mapping capability and demographic data for the forthcoming Lotus 1-2-3 Release 5.0 for Windows.

Where to start

With Release 5.0, users will be able to select cells or columns from the spreadsheet, click on a menu command and create a map of sales performance or consumer demographics by territory. A starter kit of basic census data will be included.

"The fact that they're going to include some teaser data [with the Lotus package] will provide a jump-start for business analysts who might not otherwise have tried geographical data analysis," Hale said.

Lotus' map feature will be far less capable than full-fledged GISs, but "the ease of use will help businesspeople who are not GIS users to learn new ways of visualizing their data," said David Terwilliger, GIS coordinator at the *Minneapolis Star Tribune*.

On Technology expands E-mail arsenal

By Lynda Radosevich

In the latest round of consolidation to hit the electronic-mail market, On Technology Corp. in Cambridge, Mass., last week acquired Da Vinci Systems Corp. in Raleigh, N.C.

Both companies are privately held, and the value of the deal was not disclosed.

On Technology specializes in group computing software. Its two main product lines are Meeting Maker, a group scheduling package, and Notework, a low-end E-mail product acquired last year along with E-mail vendor Notework Corp.

Da Vinci sells a more robust E-mail package that analysts rank as having the third or fourth largest PC LAN E-mail installed base.

More control and users

The move broadens On Technology's mail suite and gives it control of Da Vinci's estimated 2 million user base and its stable of value-added resellers. Da Vinci will become a wholly owned subsidiary of On Technology. The bulk of its 52-employee North Carolina office will remain to develop, support and sell Da Vinci E-mail.

On Technology, which has 90 employees, will take over marketing and executive management. Da Vinci Chief Executive Officer Bill Nussey will assume an advisory role and the chairman title, while On Technology President and CEO Christopher Risley will run the combined companies.

On Technology's Christopher Risley

DAVE MARSHALL

The acquisition of Da Vinci comes one year after On Technology's acquisition of Notework. Both Da Vinci and Notework develop E-mail front-end software that runs on Novell, Inc.'s Message Handling Service (MHS).

On Technology will continue to develop and market both Notework and Da Vinci E-mail. The company will target entry-level and small departmental users with Notework, which is "feature slim" and market Da Vinci as its higher-end system, according to Risley. Because both systems already run in the MHS back end, they are compatible, he said.

On Technology's push in the MHS market coincides with a renewed effort by Novell to promote Global MHS, the enterprise version of its messaging engine. The moves could stimulate interest in Novell's messaging strategy, according to Nina Burns, president of Creative Networks, Inc. in Palo Alto, Calif.

In the same announcement, 6-year-old On Technology said it raised $8.5 million in private financing, including $3 million from Novell.

Novell's stake

That, combined with Novell's Da Vinci holdings, which Novell increased to 28.5% in December, gives Novell a 10% stake in On Technology, according to an On Technology spokesman. Company founder Mitch Kapor and five venture capital firms also contributed $5.5 million to the financing.

The financing will help the firm continue to acquire companies with groupware products, namely forms and asynchronous group conferencing, Risley said, adding that he plans to take the company public, but not this year.

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Editorial

Welcome to Chicago

Microsoft was showing off its next-generation Chicago operating system at Comdex last month like a proud papa, and there really was a lot to like. Chicago sports a nice new menu-driven interface for novice users. It blows away the maddening 8.3 file-naming convention. It stores files in folders instead of directories and allows users to create shadow files that can be stored elsewhere on the system or on the network with pointers to the source file. Very nice. Very OS/2-like.

Software vendors and the press have welcomed Chicago as the next generation of desktop operating systems because it really is a big improvement over Windows. But I wonder how many IS managers share their excitement. Because as neat as Chicago is, it's going to be a major upgrade and support headache for the people who have to administer it.

That point struck me as I listened to a couple of speakers on a Windows panel at the show. Corporate Software CEO Mort Rosenthal was relating some of the best war stories from the front lines of his company's professional support operation. One was about the caller who was upset because her software would not run even though she had dutifully followed the instructions to "put the software on the PC" by placing the box on top of the monitor.

Frank Ramos, who supports 450 Windows users as MIS director at United American Healthcare Corp. in Detroit, told about the user who sent out a cheery birthday announcement on E-mail with an attached graphics file. Trouble is, he sent it to the whole company, thereby instantly consuming 2G bytes of server disk space.

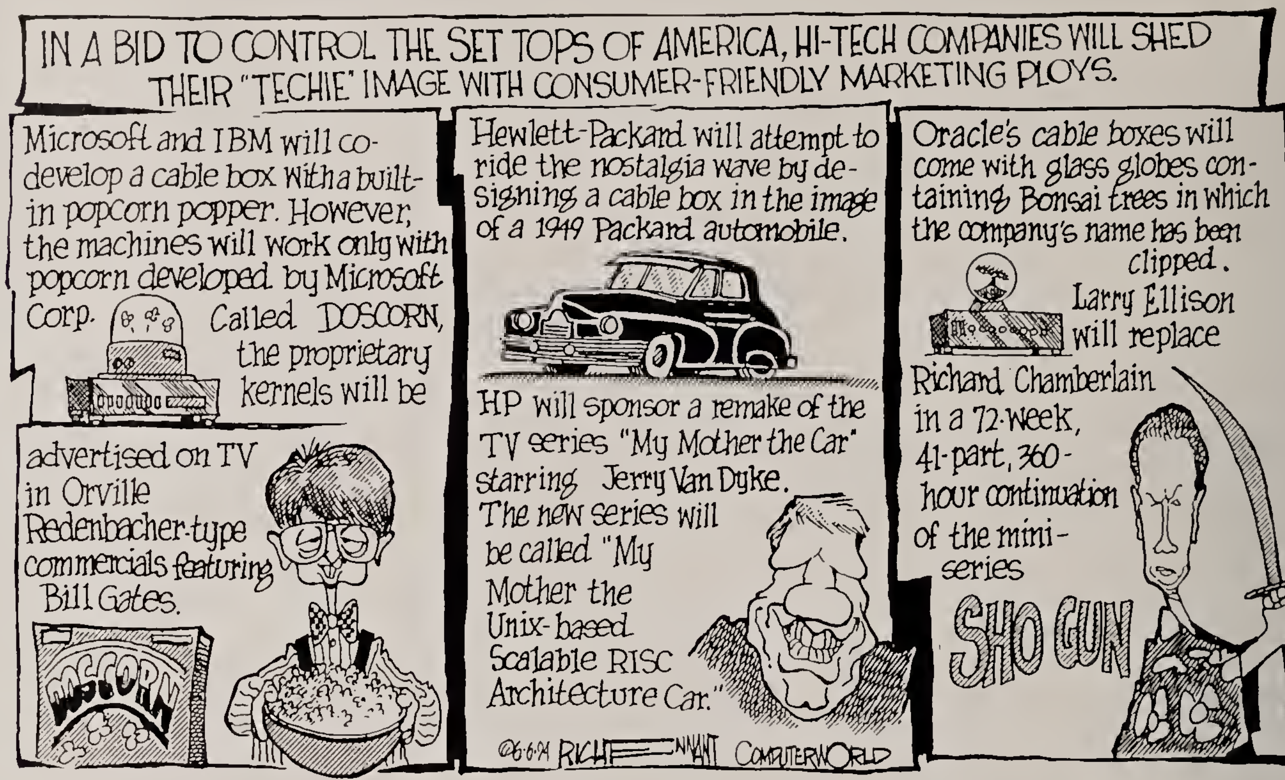
Users like those two are what keep IS directors up at night. Now they'll have to be trained and supported on yet another desktop platform.

In most large organizations, the IS group is already supporting at least a couple of different versions of DOS, Windows, a smattering of Unix and maybe some OS/2. Chicago will become the fifth or sixth desktop standard. And no matter how well engineered it is, no one can possibly know for sure how well Chicago will support the multitude of network drivers, sound cards, monitor types and terminate-and-stay resident utilities people are already using.

That task will be up to corporate IS departments around the country. Between now and the time Chicago ships, this year or next, they will have to map out migrations, train staff, prepare user-education programs, test equipment, budget for upgrades and set contingency plans for when stuff doesn't work. They will do it because users will want Chicago, and that's all that really counts.

Chicago sure is a lot nicer than what's out there today. But you have to forgive IS managers if they don't applaud too hard.

Paul Gillin, *Editor*
Internet: *pgillin@cw.com*


IN A BID TO CONTROL THE SET TOPS OF AMERICA, HI-TECH COMPANIES WILL SHED THEIR "TECHIE" IMAGE WITH CONSUMER-FRIENDLY MARKETING PLOYS.
Microsoft and IBM will co-develop a cable box with a built-in popcorn popper. However, the machines will work only with popcorn developed by Microsoft Corp. Called DOSCORN, the proprietary kernels will be
advertised on TV in Orville Redenbacher-type commercials featuring Bill Gates.
DOSCORN
Hewlett-Packard will attempt to ride the nostalgia wave by designing a cable box in the image of a 1949 Packard automobile.
HP will sponsor a remake of the TV series "My Mother the Car" starring Jerry Van Dyke. The new series will be called "My Mother the Unix-based Scalable RISC Architecture Car."
©6-6-94 RICH TENNANT COMPUTERWORLD
Oracle's cable boxes will come with glass globes containing Bonsai trees in which the company's name has been clipped.
Larry Ellison will replace Richard Chamberlain in a 72-week, 41-part, 360-hour continuation of the mini-series
SHO GUN

Letters to the editor

Time to turn up the heat on vendors

I had to chuckle over recent articles concerning the tendency of software vendors to release buggy or late first releases ["Software delays wreak havoc," CW, May 23; "Product propaganda rages on," CW, May 30]. I just installed Release 4.0 of our executive information system software, and by the end of the second day, I had logged six problem calls to the support hot line.

We really have no one to blame but ourselves, as we continue to support and do business with these vendors. Until we adopt a "get tough" attitude and start replacing their products with competitors' software, what incentive will they have to get better?

Paul J. Lourd
Greenwich, Conn.

$50 parity checking is a real bargain

In the article "An appeal to keep parity memory" [CW, April 18] IBM PC Co. President Robert Corrigan is quoted as telling a user meeting that he was having a hard time defending the additional $50 it costs to have memory with parity checking in IBM PCs.

Memory without error checking can cause various subtle problems when it fails because the bit change can occur in instructions, address pointers, disk pointers or data. The error can go unnoticed until an entire disk is corrupted or other subtle and not-so-subtle problems occur.

Memory parity checking ensures that errors that change an odd number of bits will be caught. A sophisticated operating system may be able to isolate the problem to a specific process and disable only that process. A memory failure caught early is less likely to cause directory or file table corruption.

Is it worth $50 to you to have an additional level of safety? It is to me.

Clark Morris
Bridgetown, Nova Scotia

PowerPC: Speed isn't everything

Jeffrey Henning is missing some points in "PowerPC not living up to promise" [CW, May 16]. The *real* promise of the PowerPC is not to be a faster Macintosh but to allow the Macintosh — and the personal computing world at large — to evolve into something better.

The Macintosh introduced windowing to the world at large, but the Macintosh programmer's interface is old and tired.

Macintosh applications must spend a considerable bit of effort figuring out who gets mouse events, determining what kind of events they are and redrawing little bits of display that newer windowing systems take care of automatically.

The advantage of a PowerPC Macintosh is not that it is a faster Macintosh, but that it is a machine fast enough to run existing Macintosh and Windows applications at acceptable speeds while setting the stage for a quantum leap into the future.

Tim Holloway
Jacksonville, Fla.

Simple recipe

David Michael Bernard's recipe for creating successful programs [CW, May 23] is ridiculous. Does he really believe the essence of creating successful, readable programs is as simple as variable naming, documenting and correct indenting?

Two of the three ingredients he recommends are easily accomplished: A good programmer's editor can automate any indent schemes, and a programmer can do a scan-and-replace to name variables "correctly." The most important elements of a good program are simple structured design, the absence of spaghetti code and well-defined documented entry and exit points for all subroutines and modules.

Naveen Narula
Plymouth, Mich.

BEST COMPUTER NEWSPAPER 1992, 1993
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Centralization's payback

Paul A. Strassmann

I just finished four books and 20 journal articles that praised the merits of decentralized computing. Soon every manager will be able to enjoy his own 1,000-MIPS, 10G-byte data center.

The business press is filled with stories about decentralizing computing power into client/server domains and dismantling central computer establishments. Computer vendors and consultants are happy about the prospect of selling goods to 50,000 owners of local servers instead of the impoverished 3,000 operators of central establishments.

It pains me to see assertions that promote spending a lot of money on something for which there is little evidence that it is a good deal. Here and there you will find analysts who warn that client/server computing, on a cost per seat basis, is more expensive than mainframe processing. Such numbers get dismissed by those who allege that more expensive computing is compensated by increased strategic advantage, customer sense of ownership, flexibility and improved service quality.

Nobody has any numbers to prove or disprove the case one way or another. In my years as a CIO, I have always been able to show that I could save money consolidating data centers and then save money by distributing them.

To demonstrate the effects of computers on organizations, I need to borrow techniques from the testing of pharmaceuticals. You observe rabbits that eat a blue pill and those that eat a red pill. If the rabbits that ingested the blue pill are healthier, you have just collected evidence about the advantages of the blue pill.

The problem in measuring decentralization effects is finding enough corporations that have reported on their decentralization moves. Next, you have to come up with a measure of information health for them.

Centralization was associated with success more often than decentralization.

Earlier this year, I calculated the Information Productivity of the Fortune 1,000. When *Computerworld* heard about the index, it gave me the results from its 1993 *Premier 100* survey. I found that 53 of the *Premier 100* companies provided information about their decentralization. Then it was just a matter of combining databases to see if a higher Information Productivity accompanied decentralized firms more often.

The results were surprising. Centralization was linked with success more often than decentralization. The following are the findings:

- Of 53 firms, 17 were "gainers," with positive Information Productivity, and 36 were "losers," with negative Information Productivity.
- Twice as many gainers than losers reported operating a centralized MIS shop.
- The gainers have less of their MIS staff in business units than the losers, although the difference is not overwhelming. Nevertheless, it shows you can run a centralized shop with a quarter of your IS manpower placed within decentralized operations.
- The gainers also spent less on outsourcing.

It is also worth noting that the size of the gainers and losers also differs. Being smaller than the losers, the gainers may find it easier to stay centralized.

Today's views have banished the centralized MIS organization along with the mainframe. Instead, the distributed setup is supposed to offer the most effective solution. That may happen someday, but last year's numbers do not support the view that productivity and decentralization are synonymous.

Strassmann is a consultant in New Canaan, Conn., and author of *The Business Value of Computers* (1990) and *The Politics of Information Management* (1994).

Seeking CIO: Technical experience OK

Max D. Hopper

Who during the 1960s and 1970s would have challenged the idea that the CIO role — whatever we called it then — demanded someone with a consummate grasp of technology? Those charged with taming the IS frontier and building the initial infrastructure were usually seen as a breed apart from other senior managers. But they had a critical job in an arcane discipline few of their peers understood and, for the most part, were not expected to play a strategic role in business development.

In the 1980s, that view changed when the IS infrastructure was largely in place. Companies, anxious to align IS capabilities with a strategic business focus, felt it critical to ensure that the CIO was a team player with strong interpersonal skills, someone who could share his vision and harness the available information technology horsepower to help them achieve it.

This was a constructive expansion of the CIO's earlier role, except that the revised job profile lessened the significance of technology credentials as the seeds of the CMOS era yielded the most abundant crop of new capabilities ever. Charged with selecting the most appropriate technology solutions, the CIO now faces the richest range of choices in information technology history and the riskiest decisions.

The CIO is suddenly faced with the richest range of choices in information technology history and the riskiest decisions.

Given the explosive pace of technological advances and the increasing complexity of decision-making, it's difficult not to conclude that a more balanced set of qualifications would be an asset to effective CIO performance. Business-driven strategic vision, the leadership and communication skills of a team player and the creative dynamics of a change agent are no less-revered traits. But this list of qualifications is being revisited and found wanting.

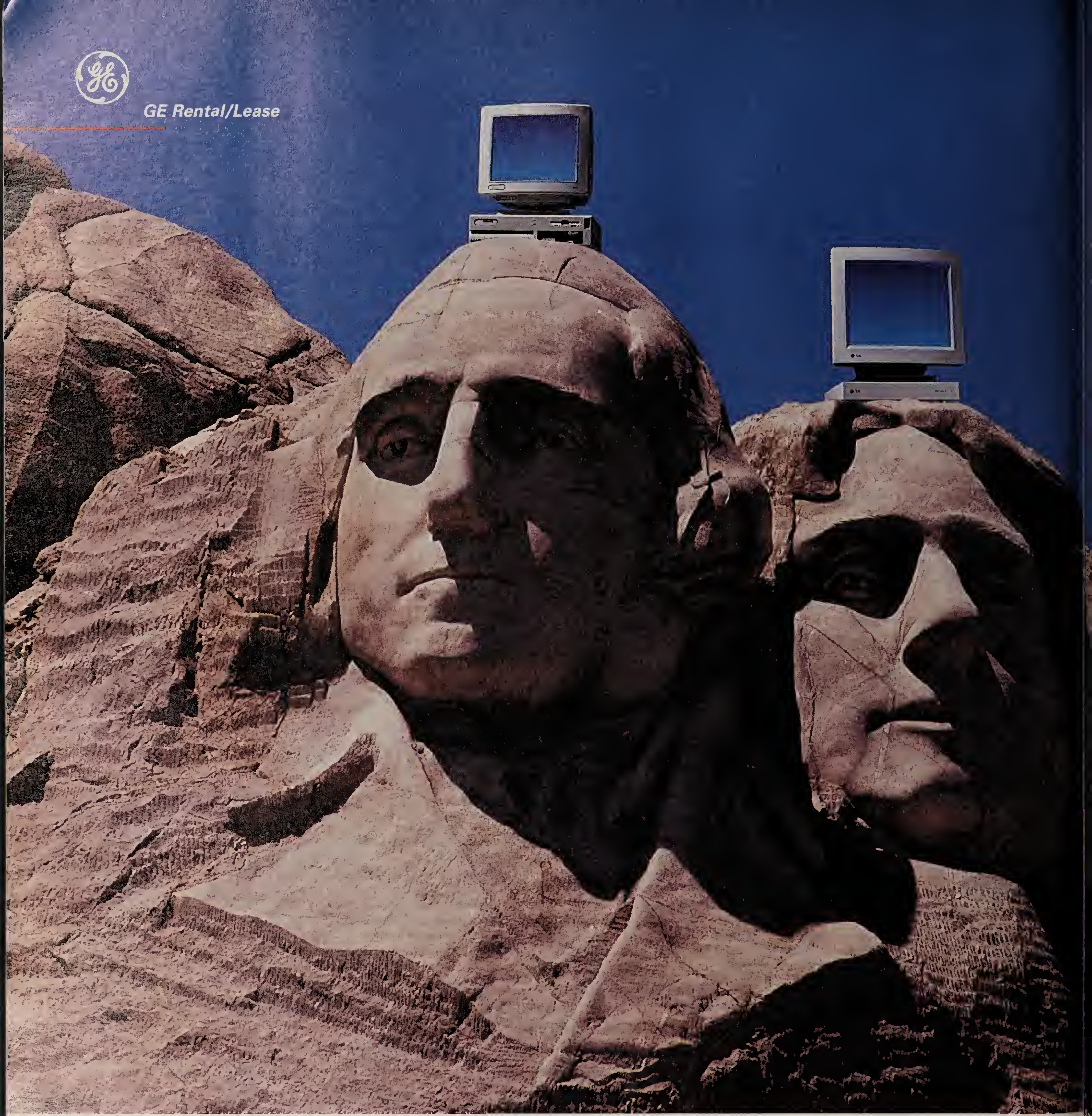
As the web of information technology interconnectivity expands to include most corporate citizens and to link with customers and suppliers, the purview of the CIO is enlarged geometrically. As this web widens further to allow anytime/anywhere links with portable and wireless equipment, to enable the rich exchanges of interactive multimedia and to eventually provide direct distribution to the consumer's living room, the challenges of integration multiply enormously.

To meet these challenges, it is axiomatic that today's CIO be firmly grounded in the legacy, evolution and future of information technology and be able to generalize and extrapolate from a fund of practical experience.

In view of these broader job criteria, where will we find individuals who fit this profile? At present, there are no formal breeding grounds for such multidisciplined candidates. With few exceptions, our universities are not producing them, and most IS departments are not growing them internally. Major technology service vendors may prove to be the most fertile resource. The battle-heartened elite from their ranks have the technology skills, a proven track record of project management and a strategic business perspective born of a diversity of business case experience.

One thing seems certain, however. Companies that have this dual expertise of technology architect and business savant at the helm will be far better positioned to exploit the emerging technologies that will define the commerce of the coming era.

Hopper is chairman of AMR Corp.'s The Sabre Group.



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PCs and Software
Portable computers

Desktop Computing

SmartSync releases update, 41
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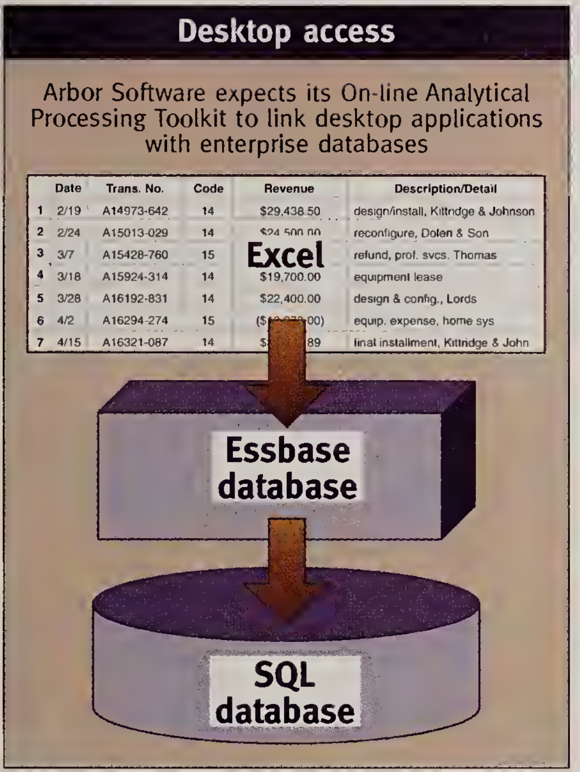
Arbor tool kit to empower Office as well as Essbase

By Stuart J. Johnston

■ Arbor Software Corp. is scheduled to deliver by year's end a tool kit to help corporate developers create systems that let users access data in corporate databases directly from Microsoft Corp.'s Office.


Desktop access

Arbor Software expects its On-line Analytical Processing Toolkit to link desktop applications with enterprise databases

Date Trans. No. Code Revenue Description/Detail
1 2/19 A14973-642 14 $29,438.50 design/install, Kittridge & Johnson
2 2/24 A15013-029 14 $24,500.00 reconfigure, Dolen & Son
3 3/7 A15428-760 15 refund, prof. svcs. Thomas
4 3/18 A15924-314 14 $19,700.00 equipment lease
5 3/28 A16192-831 14 $22,400.00 design & config., Lords
6 4/2 A16294-274 15 equip. expense, home sys
7 4/15 A16321-087 14 final installment, Kittridge & John
Excel
Essbase database
SQL database

The On-line Analytical Processing (OLAP) Toolkit, which has not been priced yet, will provide an add-in to Office that can access Arbor's Essbase server database. Arbor, based in Sunnyvale, Calif., shipped a Microsoft Corp. Windows NT Advanced Server version of Essbase last fall. An OS/2 version of the database is also available.

Essbase is not only helping sell Windows NT Advanced Server but is also helping Microsoft make headway against Notes in some corporate information systems shops, according to one analyst and user. And the OLAP Toolkit can only help.

"It's the perfect add-in to Office, and it drags in NT to shops that don't have it," said Paul Cubbage, a principal analyst at Dataquest, Inc., a research firm in San Jose, Calif. The company is also a user of Essbase, albeit on OS/2.

Essbase, in combination with Office and the OLAP Toolkit, will allow users to convert piles of data into a format they are used to, according to Arbor and Microsoft officials.

"There are avalanches of data out there but not enough information for users," said Kirk Cruikshank, Arbor's vice president of marketing. "We feel the way to do that is to deliver a server that fits between the client and the online transaction processing and database systems."

Essbase, he said, provides an intermediary system between end users and corporate databases, and it can also be used to store and re-

Arbor, *page 41*

Vendors seek aid

More software suppliers outsource support

By William Brandel

Once upon a time in the wonderful world of shrink-wrapped software, users did not have to pay the vendor for technical support; they paid only for the software package. Or so they thought.

The reality was that users, whether directly or indirectly, were paying for that technical support. It was just included in the price of their software. And with thinner margins garnered on low-priced software, vendors have to find cost-effective ways to deliver and then support their products.

"Publishers are scrambling to find a way to bump up margins that they have lost in the lower software unit sale," said Matt Cain, an analyst at Meta Group, Inc., a consultancy based in Westport, Conn. "So while users have experienced huge reductions in the price of software, more has to come back to the vendor in terms of support," he said.

Now, in addition to unbundling technical support from the applications, vendors are taking a page out of the information systems playbook and outsourcing the technical support to third parties.

Almost all the major software companies are outsourcing some of their service calls to a third party. For example, support calls for WordPerfect Corp.'s word processor application are fielded by TechTeam in Dearborn, Mich., and Sykes Enterprise, Inc. in Sterling, Colo. Some of Microsoft Corp.'s technical calls are fielded by Corporate Software, Inc., Hewlett-Packard Co., AT&T Global Information Solutions and Digital Equipment Corp.

Partial outsourcing

By and large, vendors are not yet outsourcing technical support calls at peak business hours or for strategic products. For example, Borland International, Inc. contracts Software Support, Inc. to support what it calls its "sunset" products, such as Multimate and Framework. Lotus Development Corp. outsources calls for its Magellan and LotusWorks products "during weekends and the graveyard shift," said Dave Champagne, vice president of support and service at Lotus.

Outsourcing, *page 41*

South Carolina yields license processing to Unisys

State expects digital system to reduce ID fraud

By Thomas Hoffman

Under an unusual outsourcing agreement, the South Carolina Department of Motor Vehicles (DMV) has turned over its driver's license processing to Unisys Corp., which is paid a fixed price for each license it creates with a desktop imaging system. The deal is expected to total approximately $5 million over five years.

Under the agreement — which went into effect Jan. 1 — Unisys will maintain the DMV network, including 72 Unisys PW2 Advantage Plus 486-based image-enabled workstations that are connected throughout the state agency's 70 branch offices over an IBM SNA network.

The imaging workstations, which the DMV owns and operates, are linked to a Unisys U6000 Model 65 server and a Hitachi Data Systems Corp. mainframe at agency headquarters in Columbia, S.C.

Although outsourcing is not new to state agencies, the management of an organization's desktop imaging system remains somewhat rare, according to industry analysts.

"The element that would typically get outsourced is the scanning function in a high-volume operation that requires special equipment," said Bruce Silver, vice president of workflow and document imaging at BIS Strategic Decisions in Norwell, Mass.

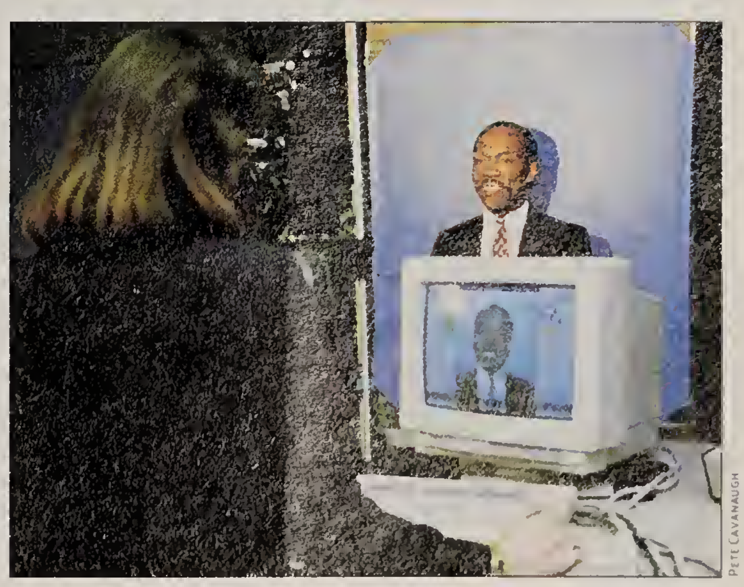
The imaging system is expected to help the state reduce the fraudulent use of driver's licenses, particularly among 16- to 20-year-olds who tamper with birth dates in order to purchase alcohol. The legal drinking age is 21 in the state, which has 2.6 million licensed drivers.

Picture perfect

The DMV now uses HDS video cameras to capture digitized photographs of each driver's license applicant. Not only is the photograph clearer than the chemical photos previously used, but applicants can also review the pictures on workstations and can have additional photos taken until they are satisfied.

The laminated photographs are also expected to help reduce fraudulent license use because the DMV will have ready access to file photos when a driver renews a license. "Now that we have a picture of you, we know what you look like. If you sent your twin brother or sister in, we might be duped, but that's highly unlikely," said Milton Dufford, director at the DMV.

The agency is also using Inforite Corp. electronic signature pads to capture each applicant's signature as yet another means to reduce identification fraud.


PETE CAVANAUGH

Unisys PC-based licensing systems *enable motorists to have photographs retaken to get a more pleasing result*

The imaging system takes less than five minutes to process and issue each license, said Benny Cox, a Unisys systems integration manager. That is 25% longer than before, according to Dufford, but Unisys executives said they are exploring ways to streamline the licensing process, such as adding more video cameras and workstations.

Between the digitized photographs, electronically captured signatures and the magnetic stripes that are encoded on each driver's license, Dufford said he believes his organization has put together a fairly secure product. "We think this system will forestall most, if not all, fraudulent activity."

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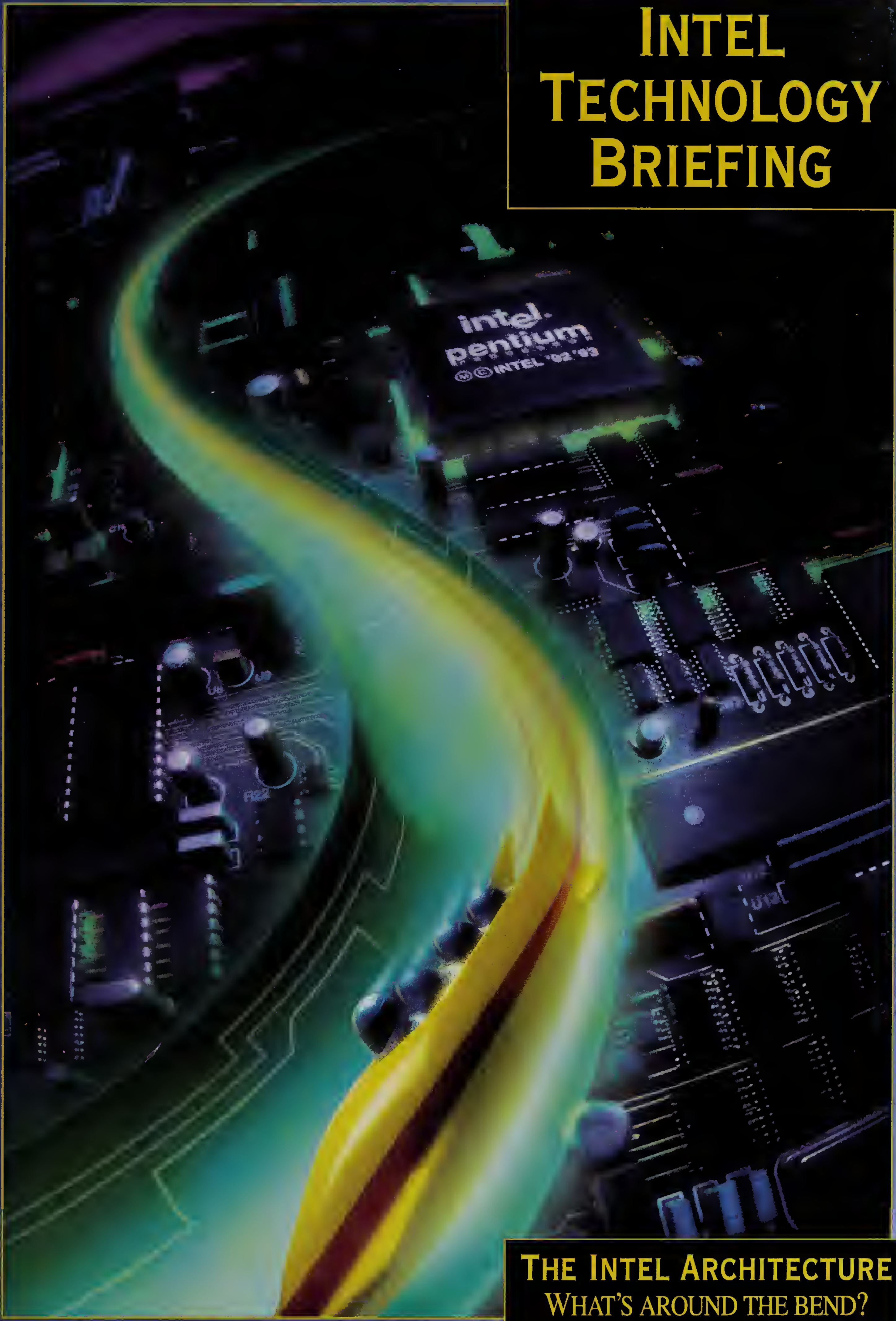

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WHAT'S AROUND THE BEND?

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During the past 15 years, Intel has introduced five generations of processors. So what's next? This technology briefing will discuss how Intel is delivering faster processors with less time between generations by combining the Intel Architecture with innovative design and manufacturing techniques. We'll even look at our new processor, code named "P6," available in 1995.

A FOUNDATION TO BUILD ON.

From the 8088 processor through the new "P6" processor, one thing has remained compatible—the Intel Architecture. But what is it?

When most people think of architecture, they think of different styles of buildings. An architect would give builders different "instructions" for constructing a Victorian-style building than a Gothic-style building.

Microprocessor architecture is similar. Intel is like the architect. We give software developers a set of instructions for writing programs. The Intel "style" of instructions, registers and memory management has remained consistent across generations. Which means the many programs already written for the Intel Architecture will be upwardly compatible with the new "P6" processor.

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In order to maintain compatibility while increasing performance, Intel must constantly develop new design techniques. We don't change the "rules" of the Intel Architecture. Instead, we make it run more efficiently.

For example, we gave the Pentium™ processor multiple pipelines for simultaneous instruction execution. In addition, we gave it 64-bit data paths, separate 8 Kb data and code caches, and a branch prediction unit to keep information flowing into the processor as quickly as possible. And we're continuing to improve the Pentium processor, which will run at clock speeds of up to 150 MHz in the next version. The "P6" processor will incorporate even more sophisticated techniques to execute instructions at over 250 MIPS.

CAN YOU BUILD IT?

Even the best design ideas are useless without the ability to economically implement them on-chip. That's why Intel expects to invest $3.5 billion this year alone in R&D and equipment—substantially more than any other semiconductor manufacturer. By predicting the manufacturing technology available years from now, we can plan today which design techniques will be possible for use in tomorrow's processors.

By developing new manufacturing processes, we are able to fit more and more transistors into smaller and smaller spaces. Not only does this allow us to add new capabilities to each new generation of Intel processors, it allows us to shrink the processors within each generation—resulting in faster performance and lower-power chips such as the 100 MHz, 3.3-volt Pentium processor.

What's more, Intel's manufacturing capacities enable us to produce tens of millions of processors every year. Enough to fill the demand as computers move into more and more households.

THE INTEL ARCHITE

THE INTEL ARCHITECTURE—A SET OF INSTRUCTIONS OR "RULES" OF OPERATION—HAS BEEN SIGNIFICANTLY ENHANCED SINCE ITS 16-BIT ORIGINS IN THE 8088 AND 80286, WITHOUT LOSING ITS SOFTWARE COMPATIBILITY. ALTHOUGH

DESIGN TECHNIQ

REGARDLESS OF A PROCESSOR'S ARCHITECTURE, DESIGNERS MUST CONSTANTLY FIND WAYS TO MAKE IT MORE EFFICIENT. WE DO THIS WITH INTEL PROCESSORS BY PERFORMING TASKS IN PARALLEL AND KEEPING DATA

MANUFACTURING

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SUPERSCALAR TECHNOLOGY
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INTEL486™ PROCESSOR
1 MILLION TRANSISTORS, 1.0 MICRON
ON-CHIP CACHE, FLOATING POINT UNIT

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275,000 TRANSISTORS, 1.5 MICRON
32-BIT INSTRUCTION, REGISTER AND DATA BUSES

INTEL PROCESSOR ROADMAP

TURE

EWER INTEL PROCESSORS ARE APABLE OF RUNNING TODAY'S 16-BIT SOFTWARE FASTER AND ORE EFFICIENTLY, THEY ARE PTIMIZED TO RUN NEWER, MORE OPHISTICATED 32-BIT SOFTWARE. PLUS, VIRTUAL MEMORY ANAGEMENT TECHNIQUES ENABLE THE INTEL ARCHITECTURE TO ADDRESS UP TO FOUR GIGABYTES OF MEMORY. SO IT SUPPORTS THE DEMANDS OF NEXT-GENERATION APPLICATIONS AND OPERATING SYSTEMS.

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EADILY AVAILABLE TO THE CHIP.

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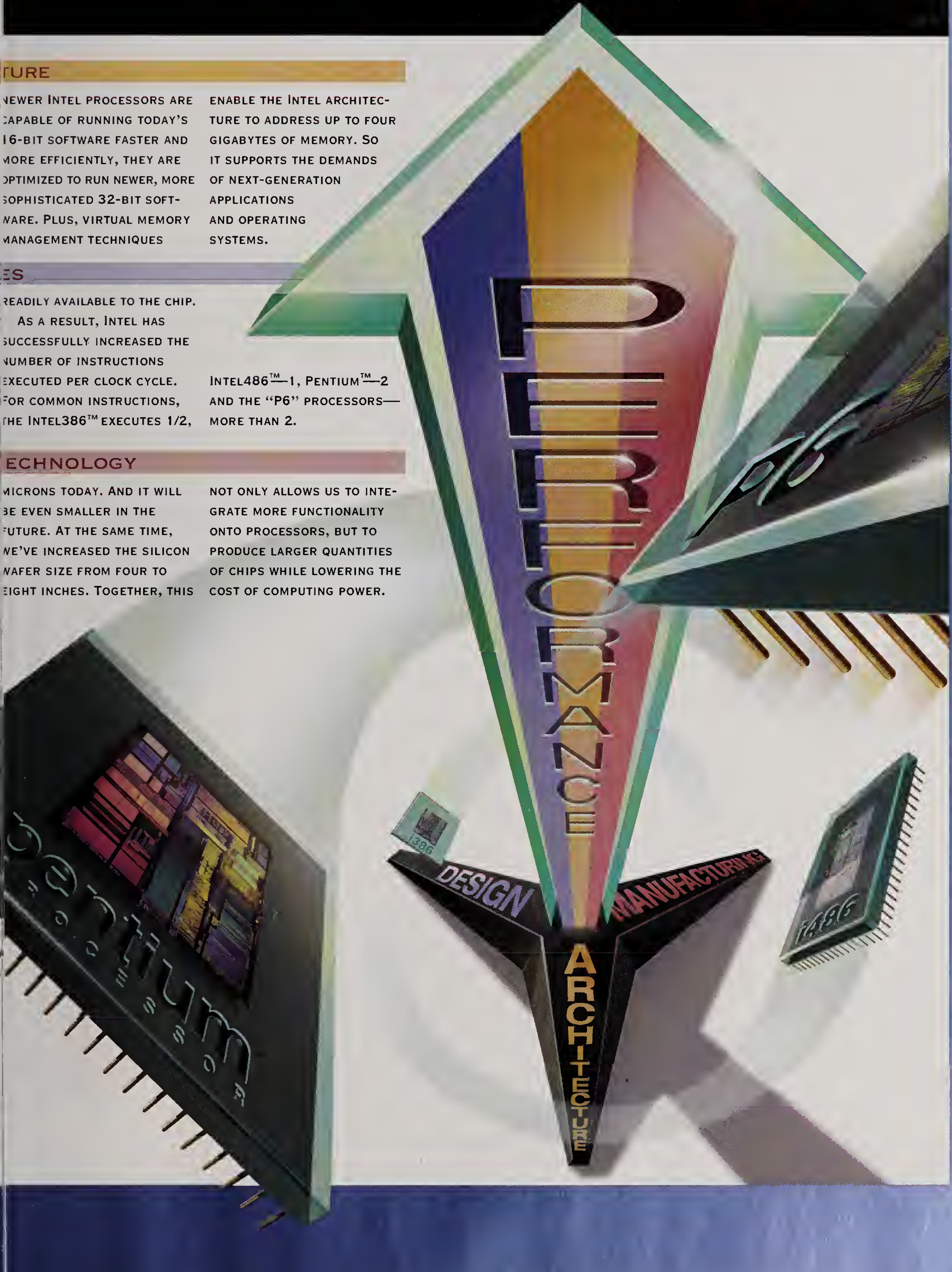
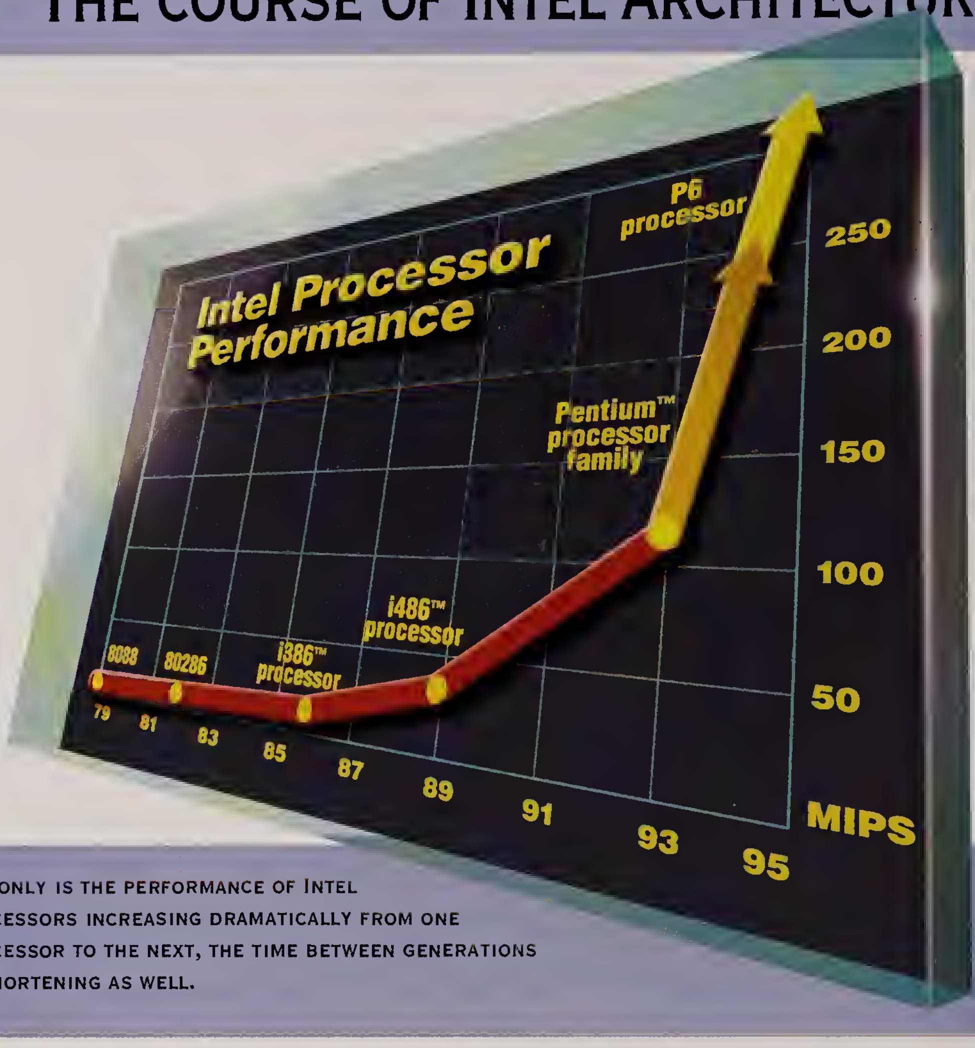
ECHNOLOGY

ICRONS TODAY. AND IT WILL E EVEN SMALLER IN THE UTURE. AT THE SAME TIME, E'VE INCREASED THE SILICON AFER SIZE FROM FOUR TO IGHT INCHES. TOGETHER, THIS NOT ONLY ALLOWS US TO INTEGRATE MORE FUNCTIONALITY ONTO PROCESSORS, BUT TO PRODUCE LARGER QUANTITIES OF CHIPS WHILE LOWERING THE COST OF COMPUTING POWER.



THE COURSE OF INTEL ARCHITECTURE.



NOT ONLY IS THE PERFORMANCE OF INTEL PROCESSORS INCREASING DRAMATICALLY FROM ONE PROCESSOR TO THE NEXT, THE TIME BETWEEN GENERATIONS IS SHORTENING AS WELL.

HOW THE NEXT GENERATION IS HAPPENING.

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SmartSync upgrades with peer-to-peer LAN support

By Michael Fitzgerald

Synchronizing watches we all know about. But synchronizing files?

"I still contend with a stack of floppies on my desk and wondering which version is what," confessed Bruce Stephen, director of hardware products and pricing research at International Data Corp. (IDC) in Framingham, Mass.

Synchronization has been a fact of life in large system environments for years. It comes up for users in the PC realm largely when someone on the road with a notebook downloads a file, changes it and then wants to get those changes onto the system with a minimum of hassle.

While a narrow issue, it is not a small one — an IDC survey showed that one of users' major requirements in the portable market is the ability to keep data files on multiple machines concurrent and updated.

The issue is most basic for users who have both a notebook and a desktop computer and who carry their files on the road. The challenge is to get changes made in a file on one system also made in the file on the other system without typing the data in all over again.

Several companies make file synchronization software utilities, and Nomadic Systems, Inc. in Mountain View, Calif., recently updated its SmartSync for Windows file synchronization package [CW, Oct. 18, 1993]. The major addition to SmartSync 2.0 is peer-to-peer LAN support.

Out of paper

This addition "gives me better ease of use for low-tech users," said Brian Ritberger, network manager at the *Sacramento Bee* newspaper. According to Ritberger, department secretaries can now ship a memo to several people more easily with SmartSync than with Microsoft Corp.'s Mail, the messaging package used at the *Bee*. With SmartSync, they can also update the documents remotely and over multiple sessions.

"We're trying to go paperless around here, and that's a nice feature," he added.

With the addition of peer-to-peer network capability, SmartSync "really has a pretty exhaustive feature set — practically the kitchen sink," said Jeffrey Henning, an analyst at BIS Strategic Decisions in Norwell, Mass.

Little need for it

Even so, some users were underwhelmed.

"Most of our users don't need to synchronize," said Brian Moura, assistant city manager for the city of San Carlos, Calif. Moura added that when he does need to synchronize files, he typically does so by updating through floppy disks.

SmartSync 2.0 costs $169.95, or $495 for a five-user pack. Current SmartSync users can upgrade for $19.95. The product is still going through final debugging and is scheduled to ship this month.

Another company recently entered the market for synchronization software. Linkpro, Inc. in Irvine, Calif., released PowerSync, a package aimed at the low end of the market. The software, which lets users update files between systems or even between two hard drives on the same machine, sells for $89.95:

Sync-ing feeling

The potential market for synchronization software is huge because it is not limited to portable users. According to BIS Strategic Decisions, 9 million people in the U.S. have portables, and 74% of them also have a desktop computer — a total of 6.7 million people who might need to synchronize files.

Outsourcing

CONTINUED FROM PAGE 39

While Lotus has arrived at what Champagne calls a comfortable mix of outsourcing — only 5% of its technical support calls — Champagne said there is an industrywide trend for vendors to outsource service calls. The reason, analysts and observers say, is that it is not a profit center for vendors.

"Look at what a vendor's main purpose is," said Randy Burkhart, senior vice president of technology at Corporate Software. "It's in developing and marketing software. It is an expensive ordeal for them to offer technical support as well."

For example, WordPerfect employs more than 950 people internally for technical support. Lotus employs more than 1,000. All these employees have to be paid benefits by the vendor, just like the vendor and marketing staff. At the same time, technical support generally lowers the revenue per employee that the vendor pulls in.

Still, most vendors continue to offer free technical support for the first three to six months after a product is delivered. One reason is that most technical support calls stem from problems that occur during installation. For vendors, the more strategic reason for taking those support calls is that it gives them a resource for tracking bugs in their product.

Naturally, Burkhart argued, it is in the best interest of information systems as well as vendors for technical support to be handled by a company such as Corporate Software. Corporate Software handles technical support calls for five of the 10 leading software publishers, he said.

Burkhart agreed with software vendors that the general trend toward outsourcing technical support will only increase. Because most software must support multiple drivers and different operating environments, vendors — especially smaller ones — will not be able to continue to offer around the clock technical support for all the environments in which their products run.

In the end, this may all be good for users. Going through third parties for support will let them shop for the best price or negotiate a deal where support gets bundled into a product purchase. Burkhart said third parties can offer support for all applications used by a company for roughly the same price per user that users now pay to support a single application.

"The new way is definitely better for us," said a PC manager at a major Wall Street investment firm in New York. "By paying more for software and not getting the technical support, it was like we were paying twice for the help call," he said.

Arbor tool kit

CONTINUED FROM PAGE 39

trieve Excel spreadsheets.

The OLAP Toolkit will not only work with Office applications but also let corporate developers take advantage of Visual Basic, Applications Edition, to smoothly integrate the add-in into the Office suite. Users will be able to access and update data directly from within Excel.

"We're using Essbase as our primary interface into it, [so] any additional functionality that they put into Excel [in the add-in] would drastically decrease the effort that we have to do," said Bill Carpenter, vice president of PC MIS at San Francisco-based BankAmerica Corp.

"We see a trend toward accessing data in these databases from Office," said Tim Level, Microsoft Excel product manager.

Additionally, the OLAP Toolkit will be adapted to have a seamless look and feel with Office under Microsoft's Office compatibility program, the companies said.

Smoothing the edge

The move may help Microsoft get a leg up on Lotus Development Corp.'s Notes, Cubbage said. "The real edge that Lotus has is the tight integration between Notes and SmartSuite," he said. This integration may help erase some of that advantage.

Essbase uses Microsoft's Open Database Connectivity technology to provide access to data stored in SQL databases.

But it is not cheap. Although pricing for the tool kit has not been decided, a five-port license for Essbase, which supports between 20 and 25 users, costs "about $35,000," Cruikshank said.

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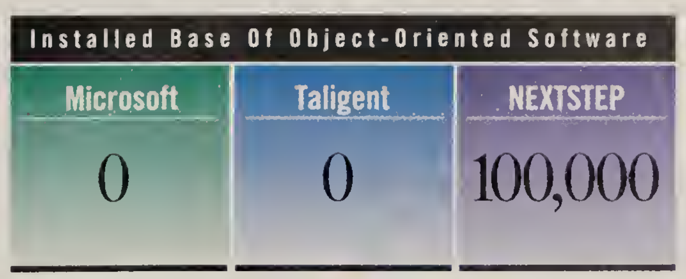

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New Products

RasterOps Corp. has announced the ClearVueColor 21, a 21-in. color display monitor for PCs and Macintosh computers.

According to the Santa Clara, Calif., company, the product features 0.25mm dot pitch for on-screen image clarity; accommodation of flicker-free resolutions of up to 1,280 by 1,024 pixels at a refresh rate of 77Hz; a tilt/swivel base; digital front control panels; and a special antiglare, antistatic, antireflective coating.

ClearVueColor 21 costs $2,449.

▶ *RasterOps*
(408) 562-4200

Lifetime Memory Products, Inc. has announced 4M-, 8M-, 16M- and 32M-byte memory cards for Apple Computer, Inc.'s PowerBook 520, 520C, 540 and 540C.

According to the Huntington Beach, Calif., company, the memory cards allow users to store all applications on RAM disks and increase battery life.

The memory cards boost the PowerBook 520/540 to the maximum allowable RAM capacity.

Prices are: 4M bytes for $300, 8M bytes for $600, 16M bytes for $1,200 and 32M bytes for $2,400.

▶ *Lifetime Memory Products*
(714) 969-2421

Cognos Corp. has announced PowerPlay 4.0, an updated version of its Windows-based business intelligence software.

According to the Burlington, Mass., company, the product presents data in organizational context to help managers understand what is happening in their area of responsibility.

New features include ranking sellers across time periods, exception highlighting and hiding, a briefing book to assemble reports, a data-compression algorithm and administrative capabilities to subset, secure and distribute multidimensional information within departments.

PowerPlay 4.0 costs $695.

▶ *Cognos*
(617) 229-6600

Kingston Technology Corp. has announced Data Traveler DT200EX, an external storage upgrade designed to increase drive capacity and provide disk portability for laptop, notebook and desktop systems.

According to the Fountain Valley, Calif., company, the product plugs into the parallel port of any system and features transfer rates of up to 1.2M byte/sec., a pass-through printer connection and an AC adapter and three-hour battery.

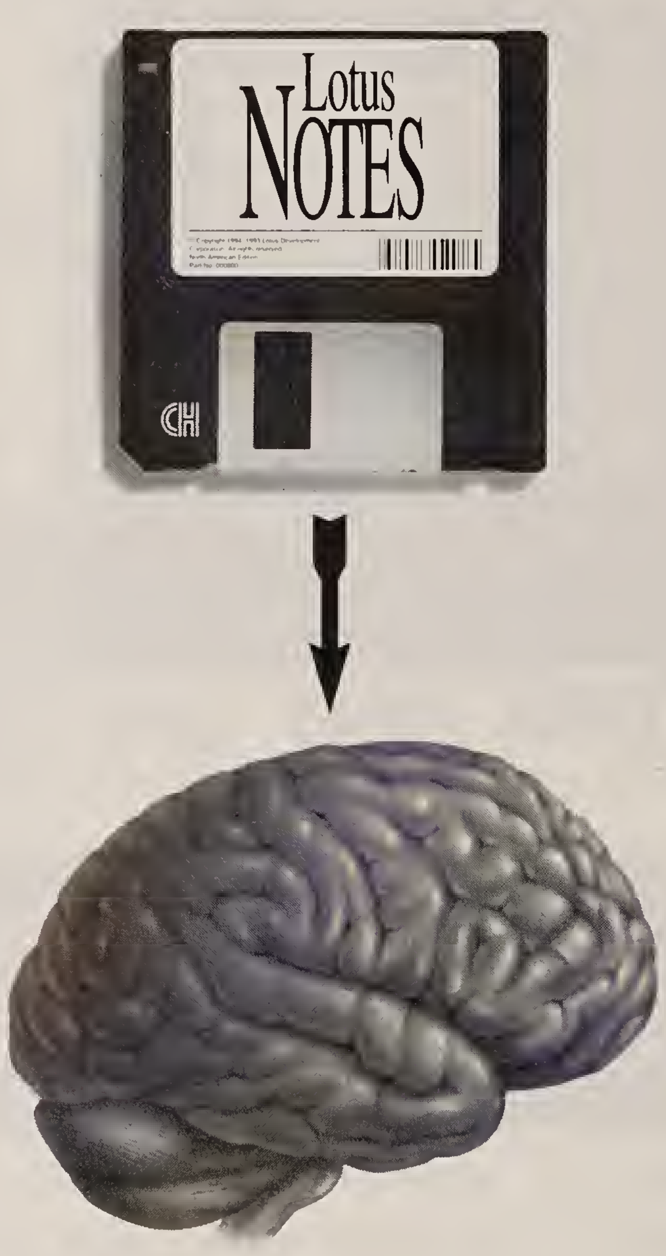
Data Traveler DT200EX comes in 127M- and 209M-byte capacities and enables disks to self-configure, providing easy data access.

Data Traveler DT200EX costs $565 for the 127M-byte version and $645 for the 209M-byte version.

▶ *Kingston Technology*
(714) 435-2600

Product shorts

MiniStor Peripherals Corp. has announced a family of 340M-, 510M- and 680M-byte 2½-in. embedded disk drives. Features include the ability to withstand up to 100G shocks when operating and up to 150G shocks when not operating and a data transfer rate of 23M to 39M bits/sec. Cost: $499 for the 340M-byte drive, $599 for the 510M-byte drive and $699 for the 680M-byte drive. MiniStor Peripherals, San Jose, Calif. (408) 943-0165. . . . **Verbatim Corp.** has introduced 5¼-in. rewritable optical disks with storage capacities ranging from 1.7G to 2G bytes. The disks, which meet European Computer Manufacturers' Association and draft ISO standards, are composed of rugged components for a hostile jukebox and network environment. Cost: $239. Verbatim, Charlotte, N.C. (704) 547-6500.



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IBM®

Forecast sunny for ATM to desktop

By Ellis Booker

Is there an ATM adapter card in your future?

This high-speed, cell-based technology is finding its first major applications in campus backbone networks and public networks operated by carriers. Some time after, so conventional wisdom goes, LANs and attached workstations will migrate to Asynchronous Transfer Mode (ATM), presumably to handle bandwidth-hungry applications.

"One school believes [ATM] is a broadband backbone technology to aggregate legacy LANs; another thinks there will be high-performance applications like real-time interactive video and multimedia," said Ron Jeffries, president of Jeffries Research in Santa Maria, Calif. "Both are right."

Yet a dozen equipment vendors have introduced or announced plans to introduce ATM adapter cards to bring ATM bandwidth to the desktop.

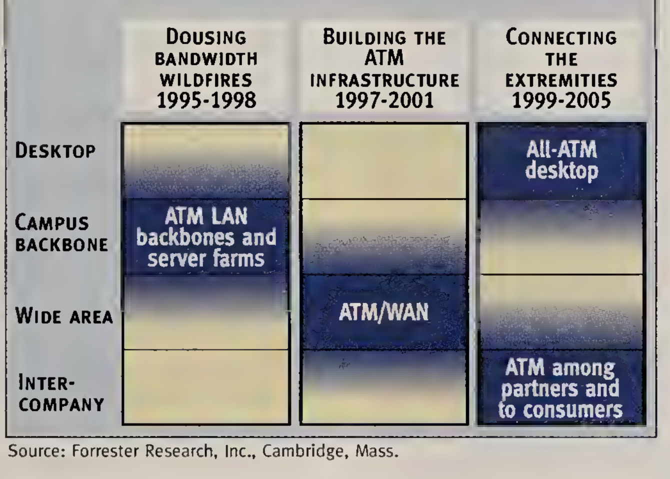
What is the short-term prognosis for ATM to the desktop? Who needs it and for what?

"Medical imaging is seriously being looked at," said Shekar Rao, vice president of marketing at Efficient Networks, Inc. in Dallas. Next year, Rao predicted, teleradiology applications connecting workstations across a wide-area network will start appearing.

Two weeks ago, Efficient Networks put its faith in ATM-to-the-desktop on the table, announcing a business strategy and a product family of ATM adapter cards. Efficient Networks' ENI-155S, a 155M bit/sec. adapter for any Sbus platform (Sun Microsystems, Inc.), is scheduled to ship in the third quarter. Efficient Networks has also announced plans to deliver versions of the card for workstations with the Peripheral Component Interconnect bus (Intel Corp. Pentium and IBM PowerPC) and GIO bus (Silicon Graphics, Inc.). Both adapters are slated to ship in the fourth quarter.

ATM milestones

ATM implementations will be spread out over a decade, starting at the desktop and backbone levels and extending out to links between companies and customers


Dousing bandwidth wildfires 1995-1998
Building the ATM infrastructure 1997-2001
Connecting the extremities 1999-2005
Desktop
Campus backbone
Wide area
Inter-company
ATM LAN backbones and server farms
ATM/WAN
All-ATM desktop
ATM among partners and to consumers

Source: Forrester Research, Inc., Cambridge, Mass.

Jeff Marshall, senior managing director at Bear, Stearns & Co. in New York, is well along with using of ATM down to workstation clusters and even individual stations. "We've pretty much decided to phase it in over the next 18 months," Marshall said.

The clusters, which range in size from two to 20 stations, currently merge their traffic onto a 155M bit/sec. backbone.

But because the investment banking, brokerage and trading firm's long-range architecture calls for bringing all applications and services — voice, data, image and video — over the same pipeline to the desktop, ATM direct to the workstation will be needed.

"The real question is, what percent of our population will have it?" Marshall said. "Over the next one to three years, a significant portion will be configured for this." He declined to quantify how big this significant number will be.

Dave Beering, staff telecommunications analyst at Amoco Corp. in Chicago, is also checking out ATM to the desktop. In January, Amoco launched Aries, an ambitious, multivendor ATM test bed. By the end of this month, Aries will have its five-node North American network in operation. Aries is currently testing ATM networking (at 100M bit/sec. and 155M bit/sec.) to some desktops and desktop clusters, according to Beering.

"The big deal in the next 18 months will be convergence of switched Ethernet to ATM," Jeffries said.

SynOptics Communications, Inc. in Santa Clara, Calif., was the first vendor to address the Ethernet-to-ATM option with its EtherCell product. EtherCell has 12 Ethernet ports on one side and an OC-3C connection back to an ATM switch on the other.

"Probably by the end of the year, you'll see dozens of these things," Jeffries said. "Not only are prices for ATM adapters still higher than Ethernet cards, but the market won't develop until there are applications that take advantage of ATM."

Recently, a company was founded to do just this. First Virtual Corp., founded by Ralph Ungermann, will seek to drive multimedia to the desktop by providing affordable ATM products, including software and 25M bit/sec. ATM hardware.

Speed it up

The ATM Forum has practically finished a spec for "midrange speed" ATM at 52M bit/sec., able to work over Category 3 unshielded twisted-pair wire. The forum is also at work on a 155M bit/sec. spec for ATM over Category 5 (data grade) twisted-pair wire and has begun to investigate 622M bit/sec. speeds over this type of wire. A competing low-speed ATM proposal, backed by IBM and others, specifies a 25M bit/sec. speed and leverages the Token Ring physical interface specification.

Client/server train tracks times

By Jean S. Bozman
JAMAICA, N.Y.

The Long Island Railroad, one of the nation's largest commuter train lines, is using client/server computing to keep track of its 725 daily passenger trains to and from New York. When something goes awry, it has the potential to affect some 250,000 one-way passenger trips made each day.

The task of managing the railroad system, which covers an area of more than 100 miles by about 20 miles, rests on a Stratus Computer, Inc. Model 300 fault-tolerant Unix server.

A central operations site here dispatches the trains while operators in 15 towers throughout the railroad system control them and record when they pass their checkpoints. A monitoring system of Sun Microsystems, Inc. IPX workstations in each of the 15 observation towers provides performance data.

The new client/server system is called TIMACS II, or the Train Information Monitoring and Control System II. The on-time data and any delays observed are first stored on a local Sybase, Inc. database on each operator's IPX machine. Periodically, the system posts these local changes to a Sybase relational database on the Stratus machine. Information is displayed to other TIMACS users, said railroad spokesman Sam Zambuto.

"We have in computer form all of the recorded movements of all of the trains for every day," said Bob Anderson, director of systems development at the railroad. "Now we can analyze where the bottlenecks are and resolve those conflicts in a much more efficient way." He said the railroad is convinced it could not maintain its 93% on-time performance without the tracking data.

DAVE MARSHALL

The TIMACS II system evolved from a TIMACS I monitoring system based on IBM Series/1 minicomputers from the late 1970s. Before that, monitoring was limited to paper-based systems and phone calls, Anderson said. During particularly bad snowstorms in the 1970s, "there were periods of time when precise locations of the trains were not known."

TIMACS II took over for TIMACS I in January. Information systems managers said the data is now more reliable than it was in the older system, although they did not provide statistics. But the new hardware, software and communications links have combined to boost data accuracy, IS managers said.

Users said they believe the data provides valuable feedback that can be used to improve traffic flow. An analysis of the traffic patterns held in the central Sybase database is later carried out on high-end Intel Corp. PCs, prompting scheduling changes if needed. Users in the railroad's transportation department in Jamaica use Lotus Development Corp.'s 1-2-3 spreadsheet and a DataEase International, Inc. PC database to carry out their off-line analysis.

IS managers said they are confident that the railroad's client/server systems and X.25 Ascom Timeplex, Inc. packet-switched backbone network will provide a flexible information resource that can be expanded to include other specialized Unix servers in the future.

Already, an IBM RS/6000 running the Oracle Corp. database hosts the human resources department's imaging application, and another

Train tracks, *page 49*

ON SITE

The Long Island Railroad
Jamaica, N.Y.

Challenge: To develop systems that accurately reflect train positions in a 134-station railroad system.

Strategy: Unix workstations monitor train positions and post local data to a central relational database.

Results: On-time performance is above 93%, and the system may be extended to five Amtrak sites in New York.

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Alpha software stable slowly filling up

By Mary Brandel

Digital Equipment Corp. has amassed what several analysts call a "reasonable" library of third-party software applications for its Alpha AXP platform, including 553 applications shipping for Microsoft Corp.'s Windows NT, which it announced at Comdex Spring '94 in Atlanta last week.

And with the recent port of its ACMS transaction processing monitor to Alpha AXP, Digital has moved much of the important layered software from VAX/VMS.

People who recently were stymied by a lack of software now say they feel positive about a migration. "Basically, all the infrastructure sofware that we were using is there," said Steven Hankins, vice president of information systems at Tyson Foods, Inc. in Springdale, Ark.

Alpha apps

By year's end, Digital will be able to claim 1,232 applications that run on both OpenVMS and OSF/1; 517 that run on OpenVMS and Windows NT; 592 that run on OSF/1 and NT; and 440 applications that run on all its operating systems, said Illuminata in Hollis, N.H.

But nothing is perfect, and some critical applications are still missing, including Transarc Corp.'s Encina on OpenVMS, analysts said. Also, users are watching for ports of popular applications such as Lotus Development Corp.'s Notes. Lotus confirmed recently that it has no plans to port Notes to Alpha.

"People are just being very cautious," said Lynn Berg, an analyst at Gartner Group, Inc. in Stamford, Conn. "They may even have Alpha versions running, but they won't publicly commit until they see market demand."

Customers are also facing the fact that certain VMS applications will never be ported. "Products with limited life spans are just not getting a lot of support, which means you can't move transparently toward mixed clusters," said Stephen Tihor, assistant research scientist at New York University in New York. "The richer your environment, the more trouble you'll have."

Customers also lament Digital's lack of a full life cycle development environment for Alpha. But it is unlikely one will appear, analysts said. Instead, Digital is partnering with the likes of Uniface Corp. and Forte Software, Inc.

In lieu of a development environment from Digital, users said they would like to see more enthusiasm from third parties. "They say they support [Alpha]," said Joseph Pollizzi III, project engineer at the Space Telescope Science Institute in Baltimore, "but it's always the stepchild. We're looking for testimonials from Oracle, Sybase [and the like] that say, 'We develop to Alpha first.'"

Train tracks

CONTINUED FROM PAGE 47

RS/6000 is being prepared to host the maintenance department's logistics, inventory and procurement applications.

A team of railroad application developers worked with consultant DRT Systems International, a Toronto subsidiary of Deloitte & Touche, to develop TIMACS II. As designed, it uses local Sybase databases on the Sun IPX workstations to store data on-site and update the Stratus server hourly, said Shivaprasad Kunchani, DRT's senior project manager for TIMACS II. Eventually, the Sun workstations may also be able to signal one another directly.

Long Island Railroad users of the TIMACS II system said they receive more information and that there is a noticeable improvement in the timeliness of information that helps them spot patterns in delays.

"We can call up a history for the day before to see which trains are late and to see where a train lost its time," said Ralph Menechino, supervisor of train movement at the railroad's Jamaica command center.

RemoteWare, and the CONVERSION OF JARED FARRELL.

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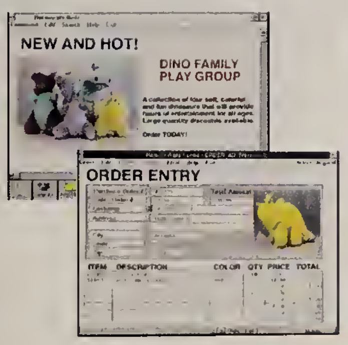
A skeptic FROM WAY BACK, Jared Farrell the Salesman had outlived more than one attempt at automating field communications. The near-daily software updates. Nightly communication sessions that didn't. Inventory that wasn't. Prospects that...weren't.

So the fact that something called RemoteWare® had been implemented to automate sales processes for farflung laptop jockeys like himself had held little charm for Farrell. A client/server system built with software tools already happily in use in hundreds of large companies worldwide, with automated dial-up communications for transporting centrally-created electronic forms, documents and reports between home office legacy systems and even the most remote PCs? Terrific. Plus routing and query facilities to make sales-critical information simple to get and easy to use... on the road. Excuse me?



But within just days of the fading hook shot that sent the CIO's announcement memo into Farrell's round file, he was using the new applications electronically dispensed by RemoteWare. Entering daily orders, filing expenses, and penning a humble note of thanks to the CIO, from 30,000 feet. All quietly and automatically delivered by RemoteWare while he slept. A fitting complement to the inimitable selling routine of one Jared Farrell. Indeed.

Now, as he slid into the Central Office Staff Room six months later and five minutes late, Farrell watched the eyes of the room swivel towards him, like half a volley at Wimbledon. And the CIO and VP of Sales were headed his way with...a plaque? "Jared Farrell, Salesperson of the Year," it read. Salesperson of the Year. Imagine that.

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CIOs get hands-on groupware experience

By Lynda Radosevich

Chief information officers in the age of re-engineering are often so busy with meetings and business planning that they do not spend much hands-on time with the new technologies they help foster. But for a group of Chicaga-area information systems executives, that is changing, at least in terms of the bellwether groupware application, Lotus Development Corp.'s Notes.

The Chicago Research & Planning Group (CRPG), a 120-member organization of Midwest IS executives [CW, Oct. 11, 1993], has begun rolling Notes out to its members. It permits those who cannot make the physical meetings to "dial in to a CIO brain trust," according to CRPG executive director Richard G. Arns.

CRPG's Richard G. Arns: *Using Notes, the group aims to create a 'CIO brain trust'*

"That gives us — the people making the decisions — real hands-on use of the product we're promoting," said Tony Salvati, president of Mercantile Technologies, a holding company within Mercantile Bancorp in St. Louis.

The CRPG is using Notes to post a catalog of training courses offered by members and vendors. It is also using Notes as a bulletin board service for posting meeting announcements and as a forum for CIOs to share views on emerging technologies and technology providers.

For members only

The CRPG, based in Barrington, Ill., was founded in 1991 to provide a sounding board for ideas and a peer group of experts. Membership is limited to CIO or CIO-equivalent executives. Full membership dues are $2,500 per year.

The move to Notes was promoted in part by a stroke of marketing savvy last December in which Lotus committed itself to supplying CRPG members with a free copy of Notes for accessing the network. Now roughly 70 of the 120 top IS executives use Notes, said Steve Michael, president of InfoTools, Inc. in Naperville, Ill. InfoTools is a value-added reseller that runs the Notes server and installs the application at member sites.

Michael estimated that 80% to 90% of those CIOs were using Notes for the first time. And for some, it was their first exposure to Windows and helped them see a reason to move to the platform. "It may have opened up some eyes.... There's still a raging debate in some companies about DOS vs. Windows," he said.

One outcome of the Notes network is that the regional organization is beginning to expand its boundaries beyond the Chicago area into neighboring Michigan, Wisconsin, Missouri and even to one member in New York, Arns said.

"With Notes, I feel closer to the group, even though I'm one of the furthest remote. It helps keep me out of 'voice jail,'" Salvati said, referring to the seemingly endless game of voice message tag that is so common today.

Arns said he sees the role of Notes in the organization expanding when AT&T Corp. offers a Notes service. "Now we have to have a Notes server. As the membership grows, the AT&T support will allow greater flexibility" by taking over the server administration.

Also, he said, Notes is more suited to the CRPG's needs than on-line services such as CompuServe or public forums on the Internet because it offers security and access control. "You're assured that the person making comments on the other end is a CIO in CRPG," Arns said.

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New Products

Aurum Software, Inc. has introduced SupportTrak 5.0 and QualityTrak 5.0, applications designed for customer service and quality management.

According to the Santa Clara, Calif., company, SupportTrak 5.0 automates all steps of the support process and provides a contract administration module that handles complex pricing and discount administration.

QualityTrak 5.0 helps manage quality and problem resolution processes and lets users enter change requests and feature enhancement suggestions into the system based on defined workflows.

SupportTrak 5.0 prices range from $59,000 to $735,000. QualityTrak 5.0 prices range from $30,000 to $180,000.

▶ *Aurum Software*
(408) 562-6370

Core International, Inc. has announced its Corearray family of scalable, host-independent and operating system-transparent dedicated hardware array subsystems.

According to the Boca Raton, Fla., company, it includes the Corearray 2000 and the Corearray Micro2000, which provide scalable redundant arrays of inexpensive disks (RAID) fault tolerance for mission-critical applications running on LAN servers and workstations.

The Corearray 2000 lets users grow from 2G to 20G bytes of LAN server storage using the same array hardware. The product can work with any SCSI-based server and many operating systems.

The Corearray Micro2000 is limited to 2G bytes of storage and was created to fit in a standard 5¼-in. disk drive bay. The product features RAID Levels 3 and 5 fault-tolerant and redundant load-sharing power supplies.

Corearray 2000 costs $27,999 for a 20G-byte configuration. Corearray Micro2000 is available for $7,499.

▶ *Core International*
(407) 997-6055

Concorde Technologies, Inc. has introduced 4mm digital audio tape (DAT) drives based on AT&T Corp.'s Dataphone Digital Service-2 (DDS-2).

According to the San Diego company, the drives support 4G bytes of native mode storage and more than 8G bytes of compressed storage per tape cartridge.

The DAT drives provide a 510K byte/sec. native transfer rate and a burst transfer rate of 3M byte/sec. asynchronous and 7.5M byte/sec. synchronous.

Model HPT4000DC is a single drive available in a table-top enclosure or an internally mountable configuration. It provides 8G bytes of compressed storage and a transfer rate of more than 1M byte/sec. Model HPT4800DC, the entry-level DAT system, uses six DDS-2 tape cartridges to achieve its typical capacity of 48G bytes. Model ADT4MMDC is a DAT autochanger system with the capacity for 15 DDS-2 tape cartridges.

Prices range from $2,495 to $29,900.

▶ *Concorde Technologies*
(619) 458-0702

Product short

Keyfile Corp. has announced Keyfile for Unix, a document imaging and management product. It automates the handling of office documents and lets paper or electronic data be filed, shared, retrieved, annotated and distributed on Windows clients in client/server environments. Cost: begins at $9,995 per server. Keyfile, Nashua, N.H. (603) 883-3800.

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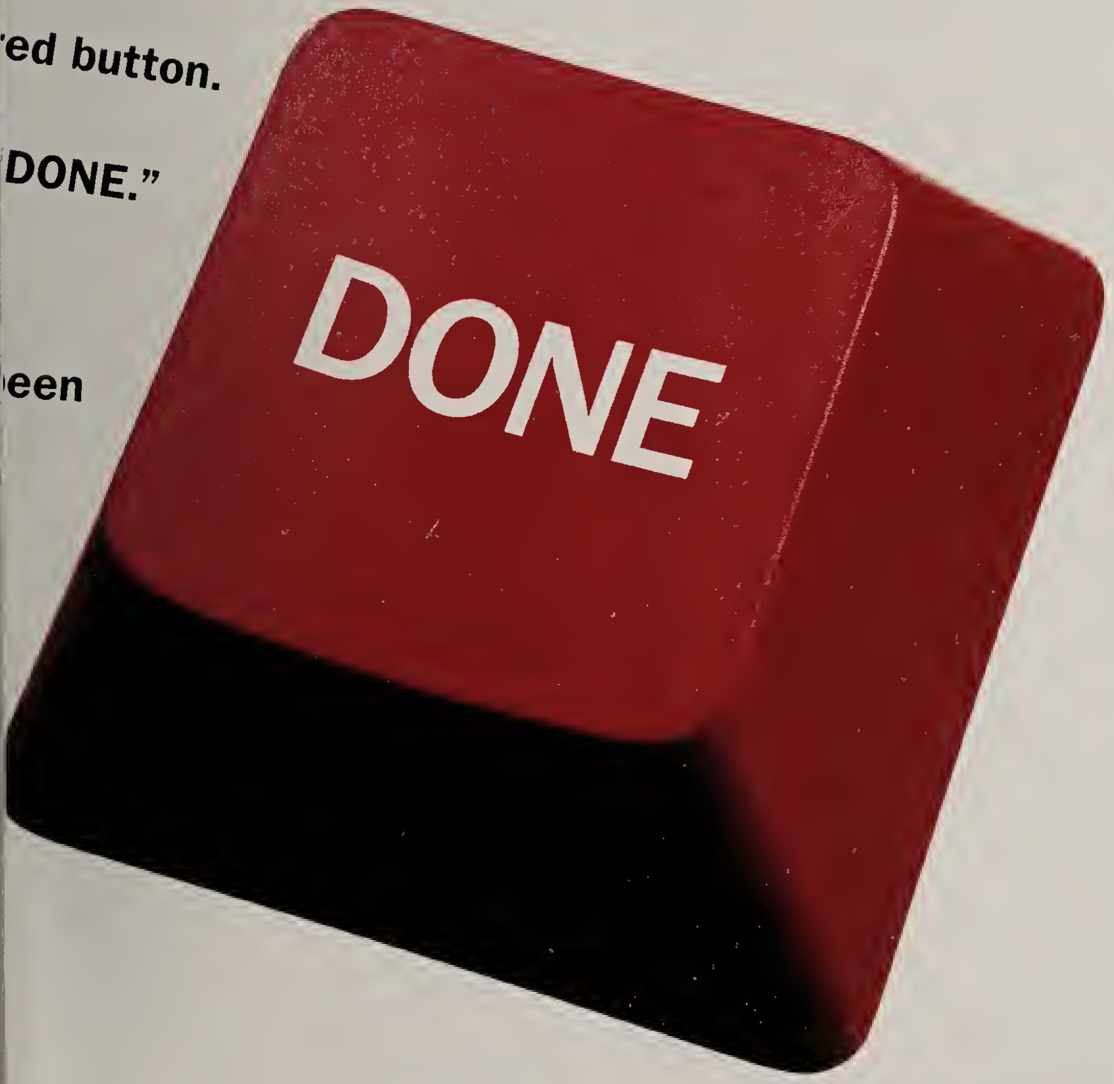

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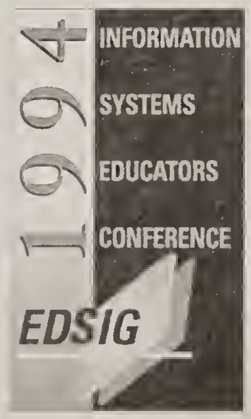

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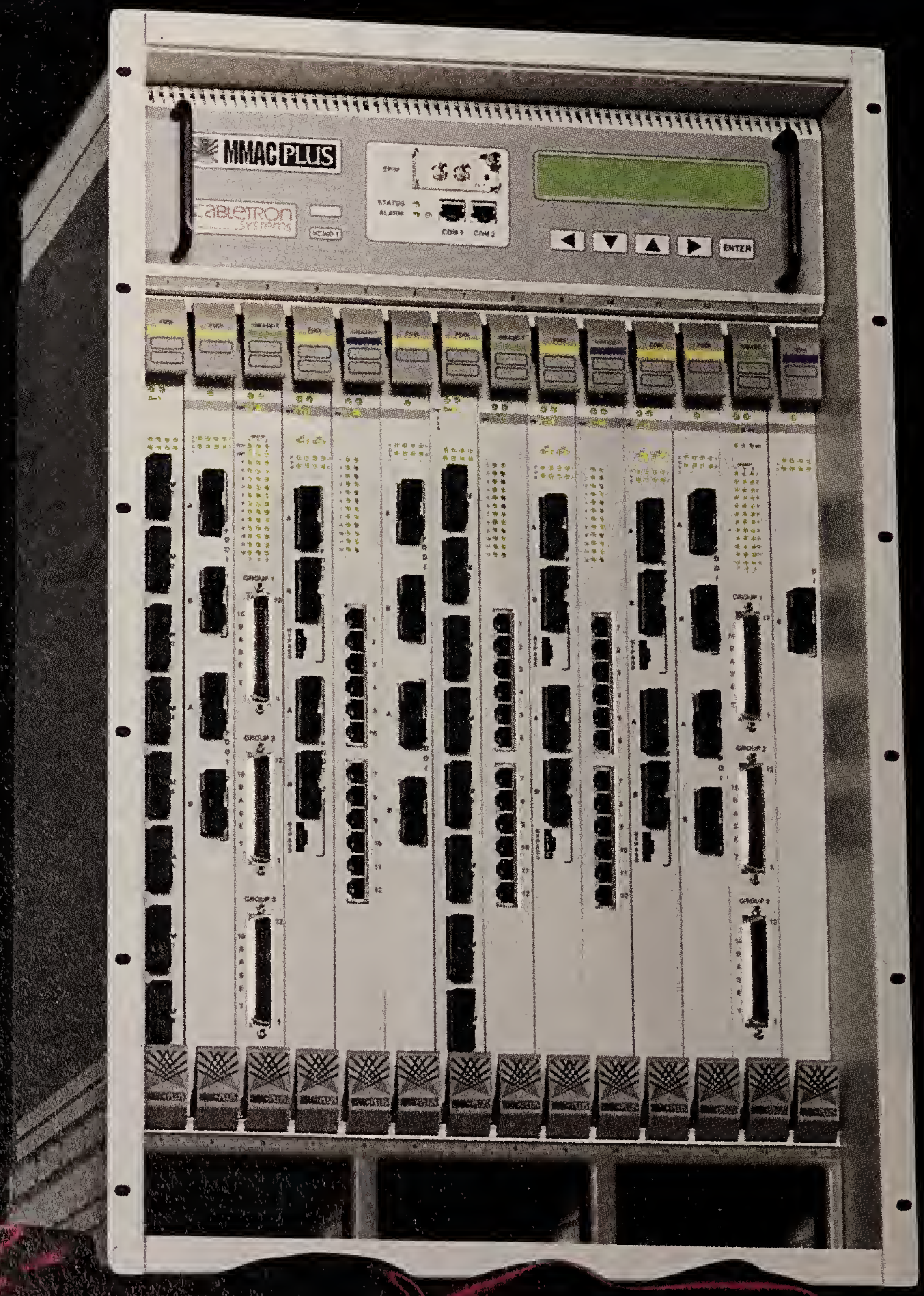

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New tools automate data management

By Mary Brandel

Backing up data on PC LANs is one thing. Actually managing that storage is something most companies have not tackled yet.

But that has not stopped companies such as Avail Systems, Inc., Palindrome Corp. and, recently, Alphatronix, Inc. from announcing hierarchical storage management (HSM) software for Novell, Inc. NetWare environments. Cheyenne Systems, Inc., Legato Corp., IBM and others have also announced plans to ship such systems.

Storage management

HSM systems automatically clear lesser-used files off disks and move them onto secondary storage devices such as optical media or tape according to parameters set by the systems administrator. Unlike with tape backup systems, end users can still call the files, albeit with slower access times. The touted benefits are higher capacities of accessible data, improved overall performance and lower management costs.

"A good HSM package is managing your data for you and maintaining records of where that data is," said Fara Yale, an analyst at Dataquest, Inc. in San Jose, Calif.

But while HSM is well-established in mainframe environments and somewhat mature in Unix, the installed base for PC LANs stands at roughly 100 units, said Michael Peterson, president of Peripheral Strategies, Inc. in Santa Barbara, Calif. "It will be 1995 or 1996 before it takes off in the PC LAN space," he said.

This year people are more concerned with "keeping the cost of backup down and

HSM, *page 58*

Reaching for functionality

A major difference among HSM systems is whether they use a dedicated server or can run on an existing server. A separate machine costs more, but it protects applications from system crashes.

The most recent kid on the HSM block — Alphatronix's Inspire Migrator — takes the existing server approach. And because it is written to the NetWare 4.01 migration NetWare Loadable Module (NLM), it will not need modification with future changes to NetWare.

"At some point, they'll be able to tie Unix and PCs together and build an enterprise architecture," said Michael Peterson, president of Peripheral Strategies.

On the other hand, Inspire was designed only to work with NetWare 4.01 or higher; Avail's NetSpace goes back to NetWare 3.0. Avail is working with Novell to define and implement the migration NLM, said Avail president Robert Wight.

But there are some things that no NetWare HSM software can do. These systems have generally not reached the functionality of their Unix and mainframe counterparts, said Bill Frank, president of Augur Visions, Inc.

"I'm not aware of any systems for NetWare where you can classify files by file type, such as which files the CEO needs," or by file size, Frank said. "Things are pretty simple at this point; therefore, the system doesn't always make the best judgment." —*Mary Brandel*

The great migration

Although NetWare users are not quite ready for hierarchical storage management, software is starting to emerge

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NETSPACE
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MSS
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PALINDROME HSM
Palindrome Corp.
Naperville, Ill.
(708) 505-3300

*CONNER OEM SOFTWARE FROM AVAIL

Source: Peripheral Strategies, Inc., Santa Barbara, Calif.

New modem standard may be moot already

By Michael Fitzgerald

Although a new modem standard due out next week will double data transmission rates, some users are already looking beyond modem technology for their data communications needs.

The V.34 standard promises 28.8K bit/sec. transmission rates — particularly important for remote users because it allows twice as much data to ship in a given time compared with today's 14.4K bit/sec. modems. However, some users of the early V.34 modems, also called V.fast modems, say there are some significant problems with those modems.

Speed setbacks

For instance, Scott Paper Co. in Philadelphia purchased V.fast modems from Motorola, Inc. but uses them at the slower speed of 9.6K bit/sec. This is in part because Scott's remote users have older PCs that cannot accommodate faster transmission rates. Another issue is noise on the phone lines, which can prevent modems from achieving higher speeds, even with built-in error correction.

"There are a lot of things that are bogging us down," said Kenneth Kirk, a computer technician at Scott Paper.

If tests with Integrated Services Digital Network (ISDN) lines go well, the new modem standard may be moot, he said. "We think the death of the modem may be down the road with ISDN coming," Kirk said.

Janet Fugazzotto, an analyst at BIS Strategic Decisions in Norwell, Mass., said modems may in fact be superseded by digital communications technologies such as ISDN, though such technologies still have not gained favor in the market.

Events leading to approval of the V.fast standard

Q1 1993
V.terbo announced

Q3 1993
V.Fast Class announced

Q1 1994
V.fast standard final draft completed

Q2 1994
V.fast standard approved

Source: International Data Corp., Framingham, Mass.

Most analysts and vendors expect the International Telecommunications Unit (ITU) Telecommunications Study Group 14 to release the V.34 standard at its meeting on June 9. Motorola and other vendors are already shipping V.34-capable modems or will upgrade their V.fast modems.

Users should see throughput at least double to a basic rate of four pages of text per second. With compression schemes employed in some transmissions, rates could increase from 57.6K bit/sec. to 115.2K bit/sec.

Fax support for the V.34 standard will not be available until sometime in 1995, according to James Rafferty, president of Human Communications in Danbury, Conn., and an ITU committee member.

A faster class

Three types of modems run faster than the current 14.4K bit/sec. standard: the 28.8K bit/sec. V.34 and V.fast-class modems and the 19.2K bit/sec. V.32terbo standard led by AT&T Microelectronics. Janet Fugazzotto, an analyst at BIS Strategic Decisions, said she thinks V.34 will win out because of its pending status as an international standard.

Benefits for some

Some vendors in the remote access business think the new standard will bring great benefit to users.

"V.34 is critical for mobile users because it gives them two times the bandwidth, so more applications become useful to remote users," said Steven E. Popovich, president of LAN Access Corp., a Torrance, Calif., start-up devoted to remote computing.

Still, even information systems managers with remote users said in many cases they are not yet able to use speeds higher than 9.6K bit/sec.

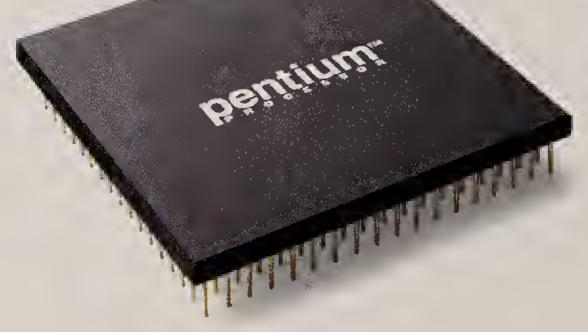
Support lacking

"V.34 is overkill for us right now," said John Finkle, manager of IS at Hyundai Motor America in Fountain Valley, Calif. Finkle said his next modem rollout will be to get up to 14.4 K bit/sec. compliance. But even with faster modems, Advantis, Hyundai's value-added network provider, does not yet support speeds faster than 9.6K bit/sec., although it has promised availability for later this year.

David McNamara, director of product marketing at Motorola's transmission line of business in Canton, Mass., said Motorola has shipped some 60,000 V.fast modems, which it plans to upgrade free of charge to users via a firmware upgrade. Motorola's new V.34R modem will cost $595. Other vendors will offer V.34 modems at prices that start below $300.

The course of computing is hereby changed.

From the old.



*(Actual size.)**

The chip on the left is getting a little old.

Its 15-year-old technology has been pushed to the limit. It worked well enough for yesterday's character-based computers, but it's having a hard time keeping up with the demands of today's computers and software.

The new PowerPC™ microprocessor from Motorola, however, is just getting started.

It's based on advanced RISC (reduced instruction set computing) technology, the technology most experts agree is the only way to reach the performance levels required by the new generation of computers and software.

Taking full advantage of its RISC technology, the PowerPC microprocessor runs faster, runs

The PowerPC Microprocessor. *The RISC Chip.*

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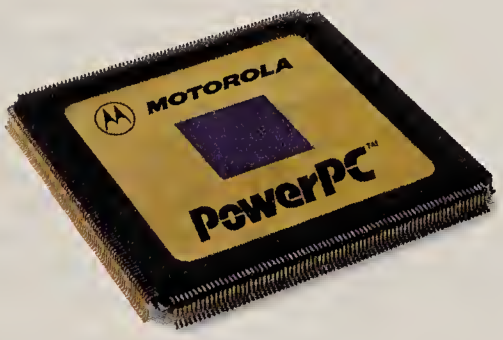
To the new.



(Smaller, cooler, faster, cheaper.)

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Network management

Concord's Trakker gets faster, easier

By Stephen P. Klett Jr.

Concord Communications, Inc. last week released an update to its network management application designed to make planning and monitoring large internetworks easier.

First introduced in 1991, Trakker is a LAN diagnostic/monitoring tool for distributed networks. It resides on a RISC-based workstation on a LAN segment and collects protocol and traffic data. This data is displayed in real time on the host and reported back to a central management console [CW, July 1, 1991].

More compatibility

Version 3.0 has a redesigned architecture built around an object-oriented C++ framework. This allows applications to be built more quickly and allows Trakker to be integrated with different management platforms and third-party agents, the company said. For example, Trakker now works with most network management platforms, including Hewlett-Packard Co.'s HP/OpenView and IBM's NetView/6000. Originally, Trakker was compatible only with SunConnect, Inc.'s SunNet Manager.

The object-oriented framework also provides an integrated Ingres relational database to provide a complete view of the network. This, in turn, helps network managers perform capacity planning, cost allocation and performance/service-level management.

"The relational database is a very nice feature to have because it allows us to keep a repository of [historical] network data that enables us to be proactive — i.e. solve problems before they occur," said T. X. Ho, senior communications analyst at Chevron Corp. in Oakland, Calif. Chevron currently deploys Trakker on more than 130 network segments to monitor more than 20,000 LAN nodes spread throughout 14 countries, Ho said.

"The integrated relational database is very significant. Management applications don't mean anything if they're not linked together, which Trakker can now provide," said Charlie Robbins, an analyst at Aberdeen Group in Boston.

Trakker 3.0 also includes the following features:

- **Enhanced graphical user interface** (GUI): Provides hypertext on-line help and training course and a window that allows users to view the activity of all segment monitors from a central workstation. It also allows icon-based development of Trakker applications.
- **Tighter application integration:** Allows applications located on the same workstation or across the network to communicate.
- **Baselining application:** Creates a baseline snapshot of all network activity for a specified time. This gives network administrators a complete view of network behavior and performance — who's using the network and what resources are being used.

Concord's Trakker Version 3.0 *has a redesigned architecture that can be integrated with more platforms and third-party agents*

Robbins said these features should make Trakker more attractive to third-party developers but added that it still needs to support the Simple Network Management Protocol Remote Network Monitoring (Rmon) standard.

Looking for platforms

Concord said it is developing application programming interfaces to enable Trakker to work with any third-party agent, including Rmon and Management Information Base-II (MIB-II). Compatibility with MIB-II will allow Trakker to use information from Cisco Systems, Inc. and Wellfleet Communications, Inc. routers.

"We want them to provide the Rmon capability, but right now this is not as major for us as the need for [Concord] to port Trakker to other management platforms," Ho said. Chevron currently uses SunNet Manager, but Ho said it is planning to bring in OpenView soon.

Version 3.0 costs $20,000 for the base console software and $6,000 for each segment or ring monitored. The object-oriented C++ framework, relational database, baselining application and enhanced GUI capabilities are available now. The multiple platform support and agents will ship this fall.

Faster updates

Trakker's enhanced GUI has cut the time it takes to update network maps. For example, Trakker user Chevron can now update a map of a 5,000-node campus network in an hour, a process that used to take up to two days, according to a Chevron senior communications engineer.

New standards coming for EDI

Standards work is under way to help rapid-response electronic data interchange (EDI) systems interoperate with other vendors' services.

This is important to companies such as Aetna Life & Casualty Co., which recently implemented an EDI network to allow hospitals to check patients' insurance eligibility in six seconds [CW, May 30].

The American National Standards Institute X12 committee is working on standards that lay out a framework for immediate response to questions about health care eligibility and benefits. The X12 committee should approve the standards in October, and large players will be able to use them by early 1995, industry experts predicted.

Also under way are standards for electronic-stripe health care cards. An X12 group developed and recommended standard data content for cards earlier this year, and the insurance industry is implementing the standard, according to Lee Barrett, assistant vice president of Aetna's Heath Plan Connectivity Strategy.

Additionally, the standards are part of a proposal from the Workgroup for Electronic Data Interchange to cut health care costs. They are also part of President Clinton's health care reform plan, Barrett said. —*Lynda Radosevich*

HSM

CONTINUED FROM PAGE 55

the reliability of recovery up," said Glen McDermed, an analyst at Gartner Group, Inc. in Stamford, Conn. "The majority are buying bigger disks instead of administering the disks they already have."

That may be fine for file- and print-sharing tasks, whereby users may be able to afford a system reboot when they hit disk space limits. But it is a different matter for mission-critical applications.

Where the payoff starts

The average NetWare server holds 1G to 2G bytes of storage, said Bill Frank, president of Augur Visions, Inc., a consulting firm in Los Altos, Calif. But at companies with hundreds of servers, several of those can be at 10G- and 20G-byte levels, which is where HSM starts to pay off. At those capacities, people need automated help to keep track of where files exist.

"That's the main reason people use this stuff. You can find [your files] better, compared to putting tapes in a little drawer," Frank said.

So even if people are not ready for HSM now, analysts said, they will need it in the near future — perhaps more so than in a mainframe environment.

"In mainframes, you need HSM because of the high cost of [disks]," said Dan Friedlander, a storage analyst in Boulder, Colo. "In the PC arena, it's more about cutting down on administrative issues."

Centralizing storage is one of those issues. "We see the number of servers and storage growing exponentially over the next three to five years," said Cheng Hsieh, a network specialist at BASF, a German chemical company with U.S. offices in Parsippany, N.J. "We have to start centralizing the file storage services through NetWare, using some type of superserver with a lot of on-line storage, as well as secondary [devices] such as optical jukeboxes."

Backup time is another issue. If users can move roughly two-thirds of their data off the server, for instance, they can shorten the amount of time it takes to back it up.

"We have five file servers here, and every day we run into files that people haven't opened for a long time and just sit there," said Renee Malones, network administrator at Comsys Technical Services, Inc. in Rockville, Md.

HSM also creates an "infinite-size storage capacity," Friedlander said, reducing the number of times you need to bring down the system to add more disks. Those types of maintenance and management costs are estimated at $8,000 per gigabyte per year, according to Peripheral Strategies.

Unwritten rules

But for the time being, "there's a great hesitancy on the part of the user community to move to HSM," Peterson said. "There's an unwritten rule [among NetWare administrators] that says, 'Don't add anything that increases complexity.' "

There is also a psychological change to be considered. "Today, as a user, I have lots of control over storage," Peterson said.

But that is an attitude that needs to change. With each user spending at least 15 minutes a day managing his files, Peterson said, "in a typical 300-user network, it's costing $1 million a year to let people do this."

Adding it up

It costs $1 per megabyte to purchase, install and configure disk storage. But for every megabyte, you add a fixed cost of $7.70 per year to manage it, according to Peripheral Strategies, a consulting firm in Santa Barbara, Calif.

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New Products

Klever Computers, Inc. has announced the K1016 and the K1032, 16- and 32-port stackable hubs designed for departmental 10Base-T networks.

According to the Sunnyvale, Calif., company, the hubs offer a front-panel architecture that provides numeric displays of network traffic and collision rates, LED indicators that provide positive indication of packet transfers and hub functioning status and individual RJ-45 port LEDs that provide port-specific collision and polarity reversal information.

Features include IEEE 802.3i standards compatibility; an attachment unit interface standard and user-configurable port for backbone compatibility; and port sensing, fault detection and port partitioning capabilities.

The K1016 costs $895, and the K1032 costs $1,685.

▶*Klever Computers*
(408) 735-7723

Advanced Computer Communications, Inc. has announced the Flash Memory Upgrade Kit and Release 7.2 Bridge/Router Software for the company's Amazon, Tahoe and Nile bridge/routers.

According to the Cupertino, Calif., company, the Flash Memory Upgrade Kit simplifies the upgrade of installed software on-site and provides 4M bytes of flash memory to store the router software.

Release 7.2 provides new data compression support for X.25, frame relay and Point-to-Point Protocol links.

Pricing for the Flash Memory Upgrade Kit starts at $750 and includes Release 7.2 Bridge/Router Software.

▶*Advanced Computer Communications*
(408) 864-0600

Alisa Systems, Inc. has announced a gateway for WordPerfect Corp.'s Office electronic mail that connects to the company's AlisaMail E-mail and directory services product.

According to the Pasadena, Calif., company, the gateway allows AlisaMail to support all major LAN E-mail systems.

The gateway supports E-mail features including mail and phone message transfer, unlimited binary attachments, text character set conversion and DOS-to-Macintosh binary file conversion.

The Office gateway costs $6,950.

▶*Alisa Systems*
(818) 792-9474

Infinite Technologies has introduced Connect2, a message router that is compatible with Novell, Inc.'s NetWare Message Handling Service (MHS).

According to the Owings Mills, Md., company, Connect2 provides high performance, system reliability and enhanced security.

Connect2 supports both NetWare and non-NetWare environments and is compatible with existing MHS and Global MHS installations.

Prices range from $149 for 10 users to $6,999 for 1,000 users.

▶*Infinite Technologies*
(410) 363-1097

Product short

LANshark Systems, Inc. has announced Virtual IP, a server for Banyan Systems, Inc. Vines that manages TCP/IP addresses and allows the network administrator to designate a set of rules to be applied whenever a PC user attempts to access TCP/IP. The product provides full reporting of IP address usage, is fully integrated with Vines and supports a Windows client for management of the service. Cost: $895 per Vines server. LANshark Systems, Reynoldsburg, Ohio (614) 866-5553.

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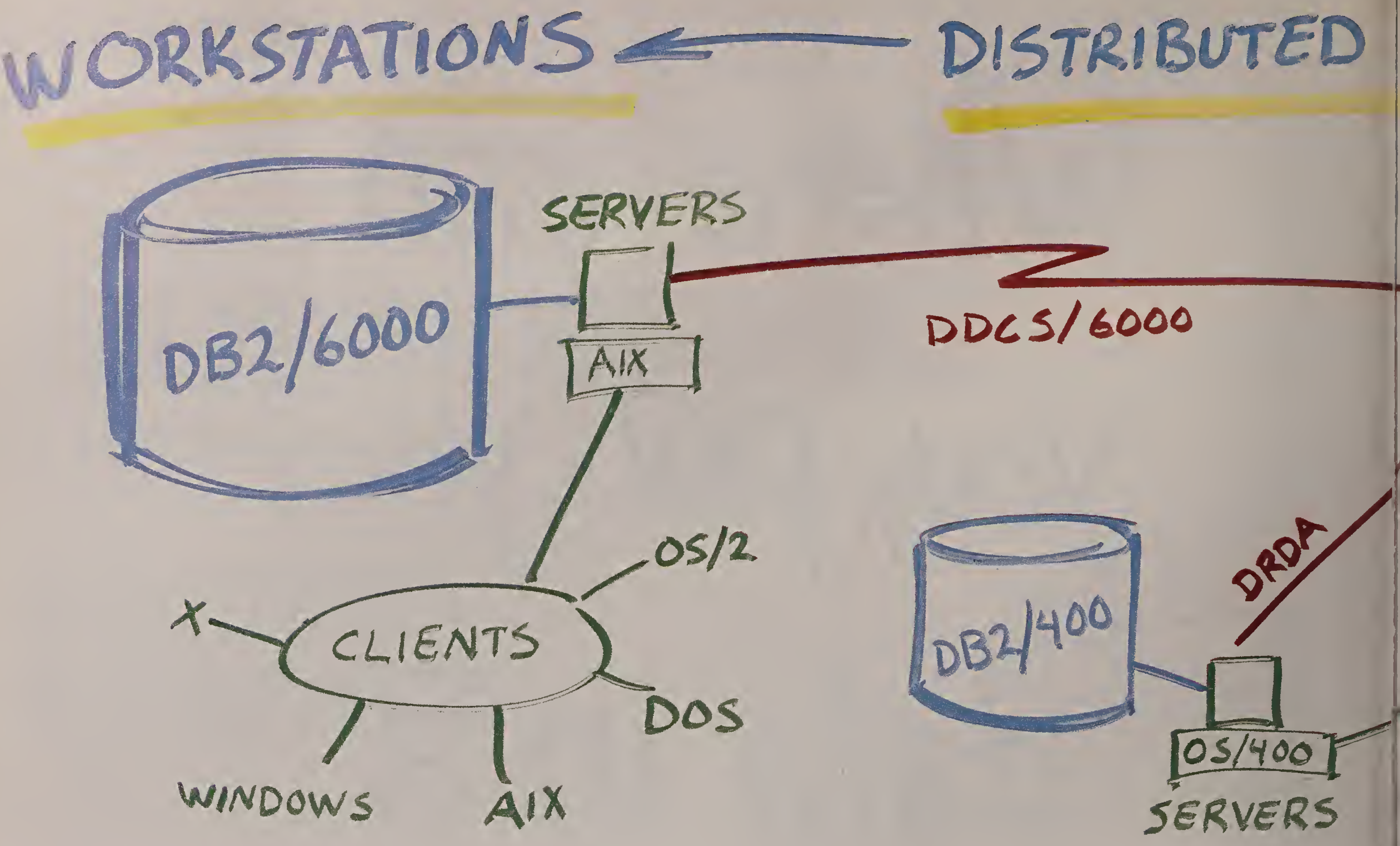

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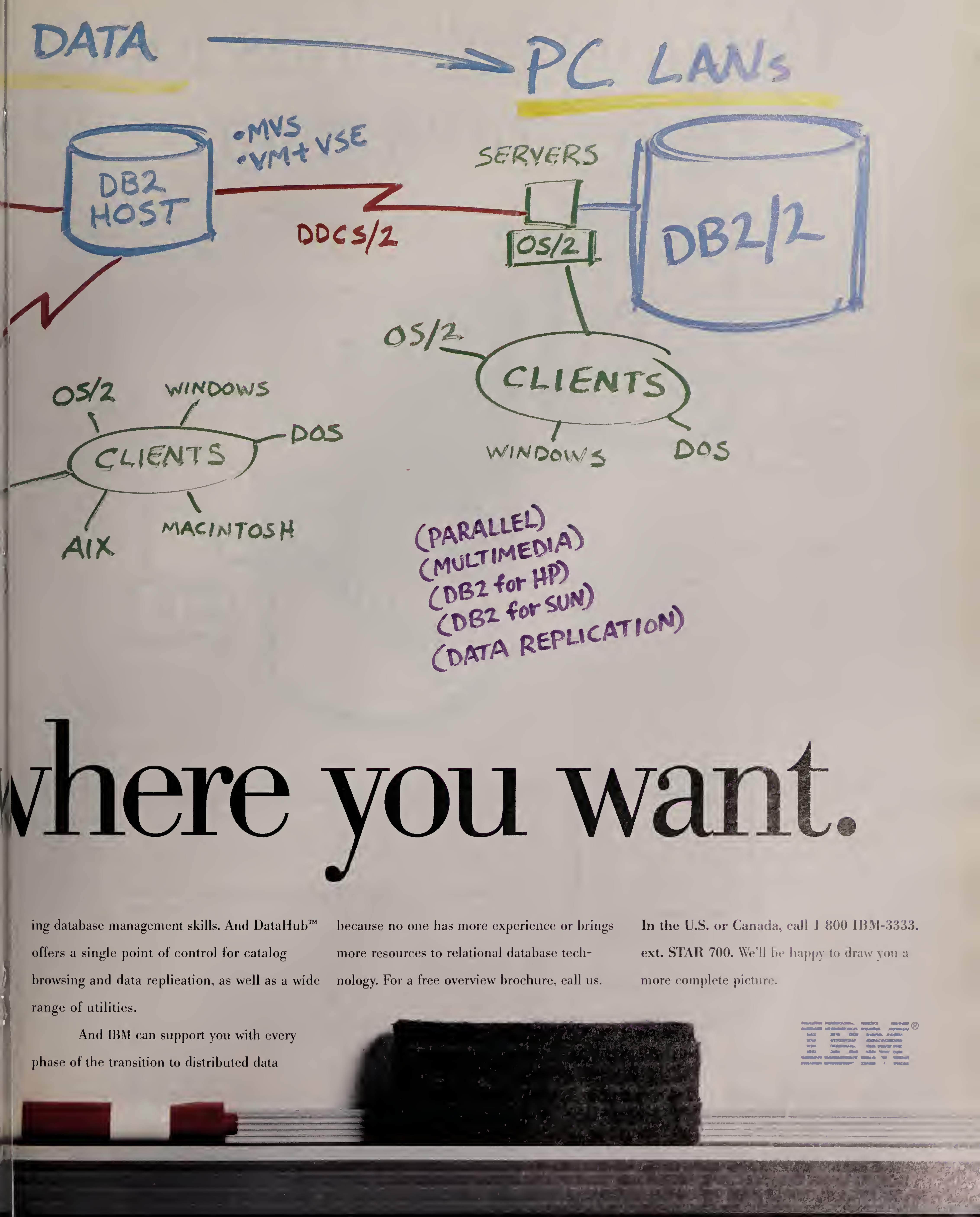

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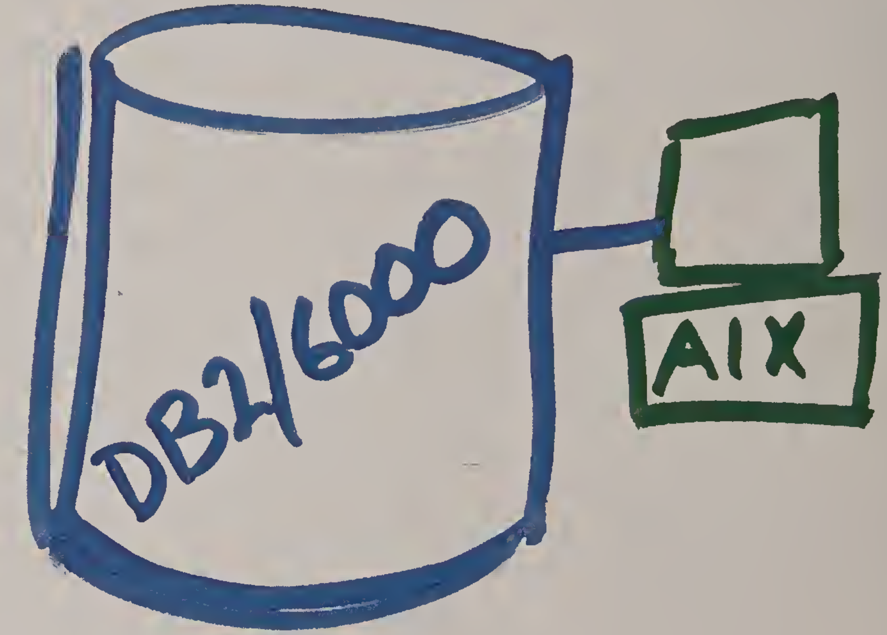

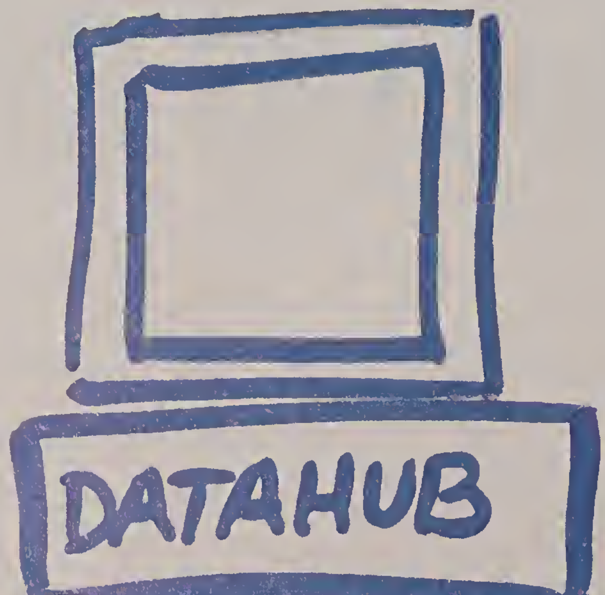

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HELP SYSTEM LETS DOCTORS MAKE EARLY DIAGNOSES, 67
NEW PRODUCTS, 72

Lifting the cloud from weather predictions

National Weather Service turns to Cray C90 supercomputer to improve severe storm forecasting

By Gary H. Anthes

It may still rain on your parade, but at least you will get a better warning.

When it comes to predicting the weather, what counts is not so much the savvy of the meteorologist but the power of the computer running the forecasting model. The National Weather Service recently replaced its primary forecasting engine with a supercomputer that is five times faster and will give more accurate predictions and more timely severe storm warnings.

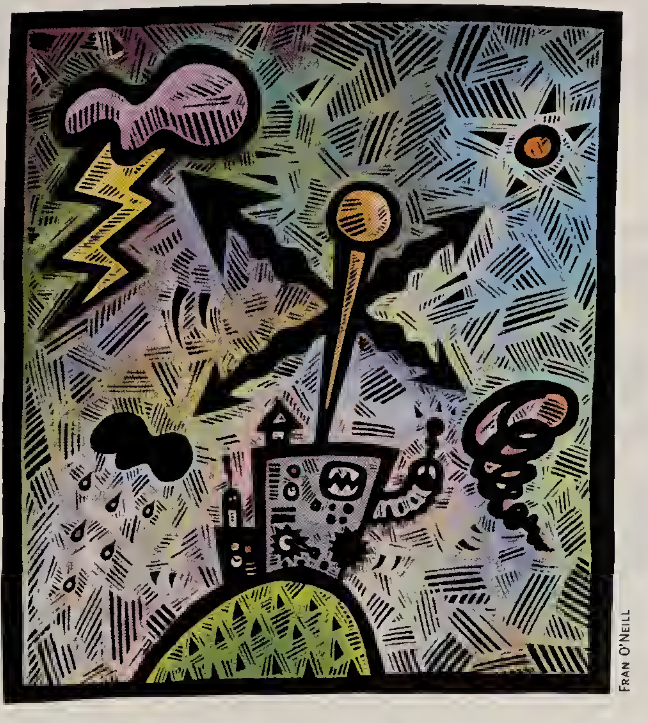
The Weather Service's National Meteorological Center (NMC) recently put its workhorse Cray Research, Inc. Y-MP8 supercomputer out to pasture, where it will be used for climate-modeling development work, and brought in a 16-processor Cray C90 for forecasting. The C90 runs at a peak speed of 16 billion floating-point operations per second (GFLOPS) and at a sustained speed of 10 GFLOPS, said Ronald D. McPherson, director of the NMC in Camp Springs, Md.

Highly accurate

A key measure of a model is how much data it can crunch in time to produce a useful forecast. This summer, the NMC will begin running a new model twice a day for "mesoscale" forecasts, which are highly accurate predictions for areas as small as 29 kilometers. Previous models had a resolution of 80 kilometers, while the earliest models, developed in the late 1950s, solved equations for points 380 kilometers apart.

Although developed on the Y-MP8, the new mesoscale model runs too slowly on it to be practical, McPherson said.

Bob Ryan, chief meteorologist at WRC-TV Channel 4 in Washington, said the mesoscale forecasts will give the public more time to prepare for severe weather. He said the model will also allow him to specify which parts of the local TV viewing area will get the most snow or ice, rather than just predict a certain snowfall for the whole area.


FRAN O'NEILL

Will the public notice the better forecasts? "It's a very subliminal thing," said Ryan, who is recent past president of the American Meteorological Society. "If you get 99 out of 100 forecasts correct, but you miss Memorial Day weekend, they tend to remember it."

Hurricane predictions

McPherson said the NMC will also run a parallel test of a new hurricane simulation program during this hurricane season. It took 12 hours to run on the Y-MP8 — too slow to make it useful — but proved highly accurate in predicting the course of the erratic Hurricane Emily last August.

McPherson said the hurricane model will run 3½ to four hours behind real time, good enough to generate useful emergency warnings. "We believe it will introduce a new era in the accuracy of hurricane-track prediction," he said.

The C90 gets data feeds from all over the world, from weather satellites, radar, sensors, aircraft and ships. Results of its forecasts are broadcast to regional Weather Service forecast offices, airlines and airports, other government agencies, universities, foreign governments and private meteorological services. McPherson said the Weather Service puts out some 20,000 different forecast "products" each day.

Cray recently supplemented its traditional line of supercomputers — which have up to 16 "vector" processors — with massively parallel computers that have 32 to 2,048 Digital Equipment Corp. Alpha processors. McPherson said the NMC may integrate Cray's massively parallel architecture, called T3D, with the C90 into one system.

McPherson said it is too early to say whether highly parallel computers will take over forecasting chores, but he said they may be the answer to the huge increase in computational power that newer forecasting models will demand.

The C90 costs $46 million for a five-year lease, about 1% of the cost of the 10-year, $4.2 billion Weather Service modernization program.

Forecasting costs

The National Oceanic and Atmospheric Administration (parent of the National Weather Service) spent the following for research on the use of high-performance, highly parallel systems to forecast the weather and predict climate change:

Fiscal 1993 — $9.4 million
Fiscal 1994 — $10.6 million
Fiscal 1995 — $16.1 million

SOURCE: NATIONAL COORDINATION OFFICE FOR HIGH PERFORMANCE COMPUTING AND COMMUNICATIONS, WASHINGTON

Client/server applications

SAP America plans improvements for R/3 package

By Rosemary Cafasso

SAP America, Inc. hopes to widen its already broad appeal in the client/server application market by addressing two issues that have begun to nag it: the perceived complexity and proprietary nature of its R/3 software.

Company officials challenge both labels, particularly the proprietary tag. Nonetheless, SAP said a number of efforts are under way that should rid it of these perceptions, including plans for more prepackaged and downsized versions of R/3 as well plans to expand the number of desktop tools that can tie into R/3.

SAP America is owned by German company SAP AG, which last year had R/3 sales of $185 million worldwide. The company does not break out U.S. revenue but said its number of North American R/3 customers jumped from 40 in late 1993 to 116 as of last month.

R/3 is an integrated set of client/server applications that includes financial, human resources, manufacturing and distribution modules. It was built with a SAP-developed language called Abap, and users need to work within the Abap environment to modify or extend the SAP environment.

"In 1993, U.S. revenues were about $100 million," said Bobby Cameron, an analyst at Forrester Research, Inc. in Cambridge, Mass. "That's a wow. They are on a roll."

But Cameron and other observers said SAP needs to provide less complex and more open versions of the software if it wants to sustain this momentum. Several observers said the big strengths of R/3 — full-blown integration and the near overflow of functions — could also be big weaknesses as SAP moves the software downstream in the market.

Depending on the selection of modules, R/3 can be a multimillion lines-of-code package that typically costs about $1 million for a 100-plus user installation. The system was designed on an integrated model, which means changes made in one module are automatically reflected in other modules.

Too complex?

"The downside is there are so many options and they are so interdependent that I don't think you can do this without considerable investment in consulting," said Mike Rood, manager of application engineering at Autodesk, Inc., which installed R/3 last year.

For its part, SAP acknowledges that it needs to make R/3 easier for customers but bristles at the word "complex."

"We don't say 'complex,' " a spokeswoman said. "We see rich functionality as a plus. How much you use is up to the end user."

Klaus Besier, president of SAP America, said complexity is a relative term that is more frequently tied to a customer's implementation plans than to the software

SAP, *page 71*

SAP America, Inc.

Parent company: SAP AG in Germany
Products: R/3 client/server set of applications, R/2 mainframe-based applications
1993 parent company revenue: $665 million worldwide
Number of employees in North America: 460
Key competitors: Oracle, Dun & Bradstreet Software

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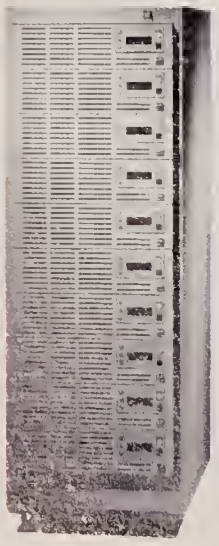
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Doctors get HELP to fight infections

Expert system at LDS Hospital assists doctors with selection of best antibiotics for patients

By Mitch Betts

When a critically ill hospital patient has a terrible cough, the doctor may suspect a lung infection. But deciding the proper antibiotic treatment is exceedingly complex—especially because the doctor must often decide before test results are available.

Considerations include the patient's medical history, the likely bacterial culprits, the most inexpensive drug that is effective against all of the likely bacteria, the proper dosage and possible drug interactions.

To help doctors with this mind-boggling decision, LDS Hospital in Salt Lake City has built "the most complex artificial intelligence system ever created for clinical decision-making," said Dr. David C. Classen, a clinical epidemiologist there.

The "antibiotic computer consultant" runs on a Tandem Computers, Inc. fault-tolerant mainframe. The expert system is just one part of a hospital-wide information system, called Health Evaluation through Logical Processing (HELP), that was developed and marketed by 3M Co.'s 3M Health Information Systems unit in Salt Lake City.

Improved care

According to a study reported in the April 25 *Archives of Internal Medicine* medical journal, physicians using the antibiotic consultant made better decisions and made them faster. The computer suggested the best antibiotic regimen for 94% of the cases studied, while unaided physicians had a 77% success rate.

Because doctors are notorious for disliking computers, "perhaps the best measure of the program is the fact that the program is accessed by physicians an average of three times per day," the study noted.

Moreover, 88% of the physicians said they would recommend the program to others, 85% agreed that the program improved their antibiotic selection, and 81% said it improved patient care.

How it works

After the doctor identifies the patient and the site of infection, the expert system determines the pathogens most likely to have caused the infection. It then displays the five antibiotic regimens most likely to be effective against all of the pathogens, as well as the cost of the prescriptions.

Since the study was completed, use of the expert system has expanded to include all cases involving antibiotics, even when antibiotics are prescribed to prevent infection during surgery. Furthermore, the system will spread to outpatient clinics and five other hospitals within the Intermountain Health Care, Inc. conglomerate, Classen said.

The key to the system's success, he said, is having electronic medical records for patients on hand. "The program actually examines several variables in that patient's history and then looks for [similar cases nationwide] over the last 10 years," before arriving at recommendations, he said.

"One of the great criticisms of artificial intelligence systems in medicine was that they were so unwieldy and required physicians to enter so much information that they never used it. This program has all of the information collected [automatically by other departmental systems] so it is available at the time the physician is making the decision," Classen said.

The 3M HELP patient care system *stores clinical information in an integrated database where hospital departments can access it*

In other words, this system is not an off-line analytical tool but is used routinely in the midst of patient care. "That's what's special about this program: complexity and real-time intervention," he said.

EMC boosts DASD performance with Symmetrix series

By Craig Stedman

EMC Corp. broadened its Symmetrix 5000 series of mainframe disk arrays last month by adding three models that let the fast-growing company compete on a wider field. The performance that EMC is promising should again provide a compelling path for customers to follow, according to users and analysts.

The new arrays expand the reach of Symmetrix from 360G bytes to 1T byte (see chart), enabling EMC to meet customer needs for bulk capacity. Until now, the Hopkinton, Mass., supplier has focused more on pure performance, leaving IBM with room to breathe on the capacity side.

No more, said Robert Callery, an analyst at International Data Corp. in Framingham, Mass. EMC now can compete "at each step in the hierarchy with enough granularity to let customers buy [disk storage] in chunks that are the right size for their shops," he said.

Lend an ear

Users who have fallen under EMC's spell in the past few years as it became a major player in the mainframe direct-access storage device (DASD) market appear ready to listen to its latest pitch.

"The performance environment is much better on Symmetrix," said John Marshall, team leader for capacity planning at General Accident Insurance of America in Philadelphia. EMC's new 5200-9, which General Accident is beta-testing, "appears as though it will be able to perform like the premium DASD of some other vendors for about half the price," Marshall added.

EMC indeed claims that the 5200-9 and 5500-9 will match the speed of IBM's 3390 Model 3, although they are targeted at the 3390 Model 9 "Fat DASD" array that IBM introduced last year. EMC is promising average access times of 17.5 msec, compared with more than 40 msec on the 3390 Model 9.

Callery said the new EMC devices may be able to do even better than that. He described the company's performance ratings as "highly conservative" and said he expects the 5200-9 and 5500-9 to run as fast in some settings as EMC's high-performance 5500-3 array, which has a 6 msec access time.

Fat DASD arrays are aimed at uses in which capacity is more important than speed, such as on-line data archiving in place of tape libraries. IBM's 3390 Model 9 sales "have been disappointing, but I think that's because its performance is too slow," said Jim Porter, president of Disk/Trend, Inc. in Mountain View, Calif. EMC's better performance should draw more interest, he added.

General Accident plans to move some of its claims and customer records from tape to the 5200-9 to provide faster access to the data. Users "were all chasing a few very large tape files and that made for long turnaround times, often more than a day," said Al Pomerantz, vice president of technical services at the insurance company.

Bag of Symmetrix

EMC's new Symmetrix models offer disk capacity ranging from 45G bytes to one terabyte. Up to 4G bytes of cache are also supported.

Model	Disk capacity	I/O per second	Starting price
5200-3	45G to 90G bytes	2,000	$450,000
5200-9	68G to 272G bytes	2,000	$549,450
5500-9	272G bytes to 1T byte	4,000	$1,525,300

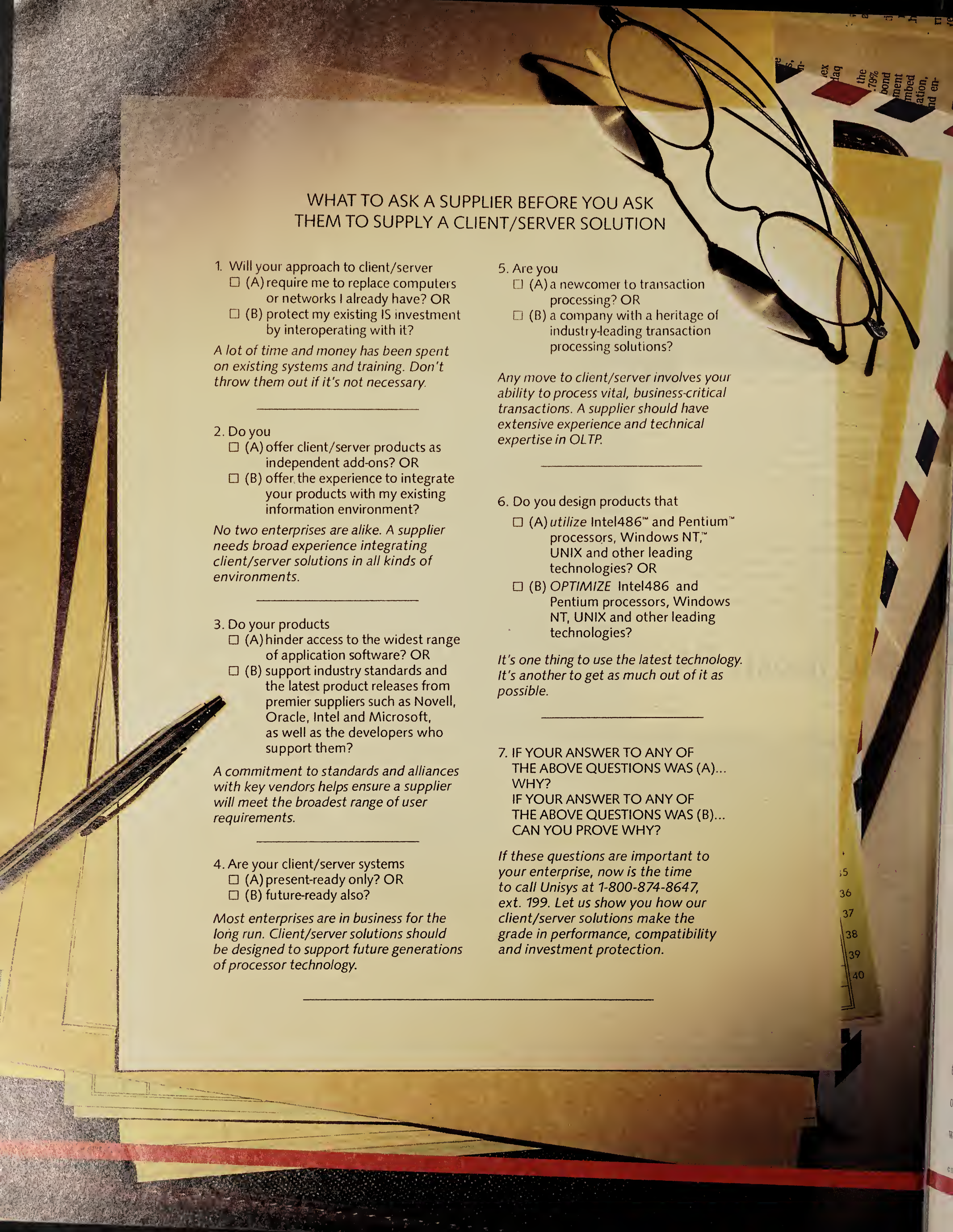
Paul Quade, director of capital planning and resource management at Galileo International, an on-line reservation company in Englewood, Colo., with more than a terabyte of data on EMC arrays, said he expects to take a close look at all of the new products for future DASD buys. The 5500-9 could be useful for high-volume batch jobs such as downloading rate information from mainframes to the company's distributed systems, he added. "We've been buying mostly EMC [DASD] of late," Quade said.

On a roll

Hitachi Data Systems and Amdahl Corp. also plan to ship 3390 Model 9 competitors in the third quarter. But analysts said the success that EMC has had should give it a big advantage. "They all make good products, but EMC clearly has the momentum right now," Callery noted.

EMC is making initial shipments of the new arrays this quarter, with volume production planned to start in the summer. List prices start at $4.85 per megabyte on the 5500-9, and Michael Ruettgers, EMC president and chief executive officer, said he hopes to command "a slight premium" over what IBM charges for the 3390 Model 9 because of the 5500-9's higher performance.

However, Callery said he has already seen EMC discount the price to between $3 and $3.50 per megabyte, which is in the range of IBM's pricing. "EMC is going to have to be in the same ballpark [as IBM], although they may be able to convince some customers that they should pay more," he added.



WHAT TO ASK A SUPPLIER BEFORE YOU ASK THEM TO SUPPLY A CLIENT/SERVER SOLUTION

1. Will your approach to client/server
   - ☐ (A) require me to replace computers or networks I already have? OR
   - ☐ (B) protect my existing IS investment by interoperating with it?

A lot of time and money has been spent on existing systems and training. Don't throw them out if it's not necessary.

2. Do you
   - ☐ (A) offer client/server products as independent add-ons? OR
   - ☐ (B) offer the experience to integrate your products with my existing information environment?

No two enterprises are alike. A supplier needs broad experience integrating client/server solutions in all kinds of environments.

3. Do your products
   - ☐ (A) hinder access to the widest range of application software? OR
   - ☐ (B) support industry standards and the latest product releases from premier suppliers such as Novell, Oracle, Intel and Microsoft, as well as the developers who support them?

A commitment to standards and alliances with key vendors helps ensure a supplier will meet the broadest range of user requirements.

4. Are your client/server systems
   - ☐ (A) present-ready only? OR
   - ☐ (B) future-ready also?

Most enterprises are in business for the long run. Client/server solutions should be designed to support future generations of processor technology.

5. Are you
   - ☐ (A) a newcomer to transaction processing? OR
   - ☐ (B) a company with a heritage of industry-leading transaction processing solutions?

Any move to client/server involves your ability to process vital, business-critical transactions. A supplier should have extensive experience and technical expertise in OLTP.

6. Do you design products that
   - ☐ (A) *utilize* Intel486™ and Pentium™ processors, Windows NT,™ UNIX and other leading technologies? OR
   - ☐ (B) *OPTIMIZE* Intel486 and Pentium processors, Windows NT, UNIX and other leading technologies?

It's one thing to use the latest technology. It's another to get as much out of it as possible.

7. IF YOUR ANSWER TO ANY OF THE ABOVE QUESTIONS WAS (A)... WHY?
   IF YOUR ANSWER TO ANY OF THE ABOVE QUESTIONS WAS (B)... CAN YOU PROVE WHY?

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SAP

CONTINUED FROM PAGE 65

itself. Yet he said, "We are focusing on making the process as easy as possible for the customer."

Topping that list is the plan for prepackaged systems. SAP began this effort two months ago when it launched Special Delivery, a bundled system that includes hardware, R/3 software and consulting services for a fixed price of $500,000. Although he would not give a time frame, Besier said the company is gearing up to ship additional prepackaged versions targeted at either specific customer classes or industry segments.

"It's a good strategy," said Jeff Comport, an analyst at Gartner Group, Inc. "It won't eliminate the complexity, but it will

very focused on large organizations — the ones willing to pay money to consulting firms to get it implemented," Scholze said. "This is an excellent way for them to get into smaller-size companies."

Open system

Besier also took issue with the proprietary label that some observers have put on R/3. He acknowledged that the software was designed with an internally developed Abap but said that alone does not make it a closed system.

"I have heard those comments [about R/3's proprietary architecture], and people have asked me, 'Why use R/3?' " added Jack Spurgeon, vice president and director of systems and computer services at Eastman Chemical Co. "My answer is it may well be true, but it will do what I need it to do. I am more interested in adding value to the business."

Besier noted the software runs on multiple databases, including systems from Oracle Corp., Sybase, Inc. and Informix Corp. It runs on Unix and was ported recently to Microsoft Corp.'s Windows NT.

In addition, the current version of R/3 contains links to Microsoft's Access, which lets users get R/3 data from Access. Also, SAP plans to open R/3 even more by releasing a tool kit with the software's next release. This will enable users to hook in more desktop applications. R/3's next release is now scheduled for the third quarter.

tools to build several distribution, sales and office applications with the help of Oracle consultants.

Bull mainframes debut

Bull HN Information Systems, Inc. announced a series of large and midsize Bull DPS 7000 machines last week, based on Bull's CMOS/VLSI chip technology, as well as peripherals and software for client/server applications. The DPS 7000/800 series can handle up to 7,000 users and sells at $1 million to $4.4 million. The DPS/7000/4x5 series handles up to 1,000 users and costs $175,000 to $875,000.

Tandem sets benchmark

Tandem Computers, Inc. said last week at the International Tandem Users Group meeting in London that it had set a TPC-C benchmark of 12,021 TPC transactions on a 64-processor Himalaya K 10,000 parallel server running Tandem's NonStop SQL/MP relational database.

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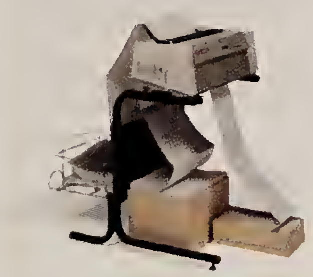

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New Products

Avtech Software, Inc. has announced PagerVSM, a remote notification software product.

According to the Newport, R.I., company, the product monitors Digital Equipment Corp. VAX systems and automatically sends a text message or status code to specified systems staff when it detects various predefined events.

PagerVSM provides an interactive paging capability that allows VAX users to page someone from the system. The product can be set up to page groups, page only during specified times of the day and send mail instead of paging.

Pricing ranges from $795 to $2,585.

▶ *Avtech Software*
(401) 847-6700

Generic Software, Inc. has announced Release 1.1 of Purchase Order/Receiving, a purchase order system.

According to the Madison, Miss., company, the product can be used as a standalone system or in conjunction with the company's Inventory Control and Order Entry/Invoicing systems.

Features include multicompany capability; on-line inquiry, entry and editing; automatic purchase order number assignment; purchase order cancellation or modification; open or blind receipts entry; and partial shipment allowability.

The product is available for the IBM AS/400, System/34 and System/36.

Purchase Order/Receiving costs $395 per CPU for the System 34/36 and $495 per CPU for the AS/400.

▶ *Generic Software*
(601) 853-1189

Princeton Softech, Inc. has announced Version Merger Release 4, a mainframe programmer productivity tool.

According to the Princeton, N.J., company, the product expands copybook members and called subprograms in-line during edit sessions, highlights copybook members and called subprograms that have been modified, and allows programmers to view these modifications.

Features include recursive editing, ISPF packed data support, multisession support, enhanced impact analysis and IBM's Cross Systems Product support.

Version Merger Release 4 costs $23,500 for a permanent site license.

▶ *Princeton Softech*
(609) 497-0205

Product shorts

Large Storage Configurations, Inc. has announced the Integrated Data Server/Storage Archive Manager Distributed Data System Management System, a network storage management system. It was designed to manage and protect network data by allocating data to a variety of media. The system can accommodate and integrate magnetic disk, cartridge tape, optical disc and associated robotic devices. The system stores data for any system that supports TCP/IP, Network File System, File Transfer Protocol and other standards. Cost: Starts at $48,000. Large Storage Configurations, Minneapolis, Minn. (612) 788-6008. . . . **Computer Power, Inc.** has announced the Defender Fast Transfer Uninterruptible Power System. It provides full-time conditioning against surges, spikes, noise, brownouts and other irregularities, with eight hours of battery backup. The product is available from 100VA through 2,000VA. Cost: Starts at $540. Computer Power, High Bridge, N.J. (908) 638-8000.

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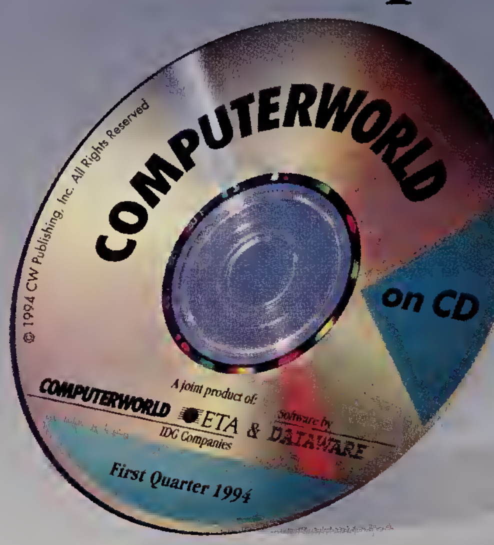

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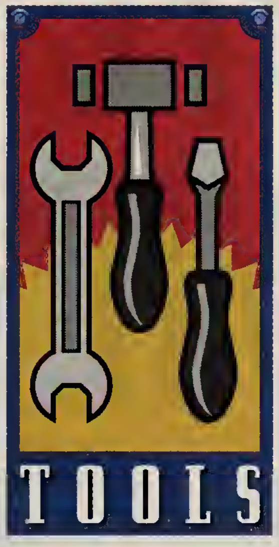
Tool upgrades find some common ground

By Kim S. Nash and Melinda-Carol Ballou
SAN FRANCISCO

One-upmanship continued recently in the competitive client/server application development sector. Uniface Corp. in Alameda, Calif., and Gupta Corp. in Menlo Park, Calif., unveiled upgrades to their respective tool kits at DB/Expo '94 here late last month.



"The interesting thing here is Uniface and others such as Progress are trying to give support for client-side development, and Powersoft and Gupta are trying to scale up," said Donald A. DePalma, an analyst at Forrester Research, Inc., a consulting firm in Cambridge, Mass. "In two years, these tools are going to look identical in terms of topological support, or they won't be in business."

The new products share several similar features, such as point-and-click programming for building screens and forms and a central storehouse for organizing and saving objects for reuse.

However, Uniface 6.0 and SQLWindows 5.0 also offer different features. For example, Gupta added the ability to integrate applications built using SQLWindows with popular electronic-mail systems, such as CC:Mail, and with Notes, both from Lotus Development Corp.

And Uniface added five workbenches that feed objects, business rules and data structures into a central location called Application Objects Repository.

Selling strategies

Gupta and Uniface also take different marketing thrusts. Uniface touts model-based application development by talking about a built-in repository to hold data and business blueprints.

Team programming, meanwhile, is being pushed by Gupta. SQLWindows includes features intended to ease the process of building software in groups. For example, the product tracks which developer has checked out which section of an application in progress so colleagues do not try to work on the same piece of a project simultaneously.

Olsten Kimberly Quality Care plans to upgrade from Uniface 5.2 to Uniface 6.0 "as soon as we get the product next month," according to Matt Rebeck, manager of applied technologies at the Overland Park, Kan., home health care company.

Uniface's structured, model-driven approach to development appealed to Rebeck, who considered "all the popular, very well-known development tools" in the class of Powersoft Corp. and Gupta before he chose Uniface. He declined to specify which other products he evaluated.

"The most significant feature with the new release is the move toward a more graphical, object-based environment," said Dick Hubeny, project manager at Pratt & Whitney, a division of United Technologies Corp. in East Hartford, Conn., that manufactures jet engines. Uniface has been a "very robust and powerful product, but there was a fair amount of training involved to use the earlier release of the tool," Hubeny said.

Positive reception

A demonstration at DB/Expo of Gupta's so-called QuickObjects graphical forms-builder technology drew several onlookers eager to see improvements to SQLWindows.

Gupta tools "have kind of stood still for a while, so it's good to see them getting into more advanced technology," said one observer from a large utility firm who did not want to be identified.

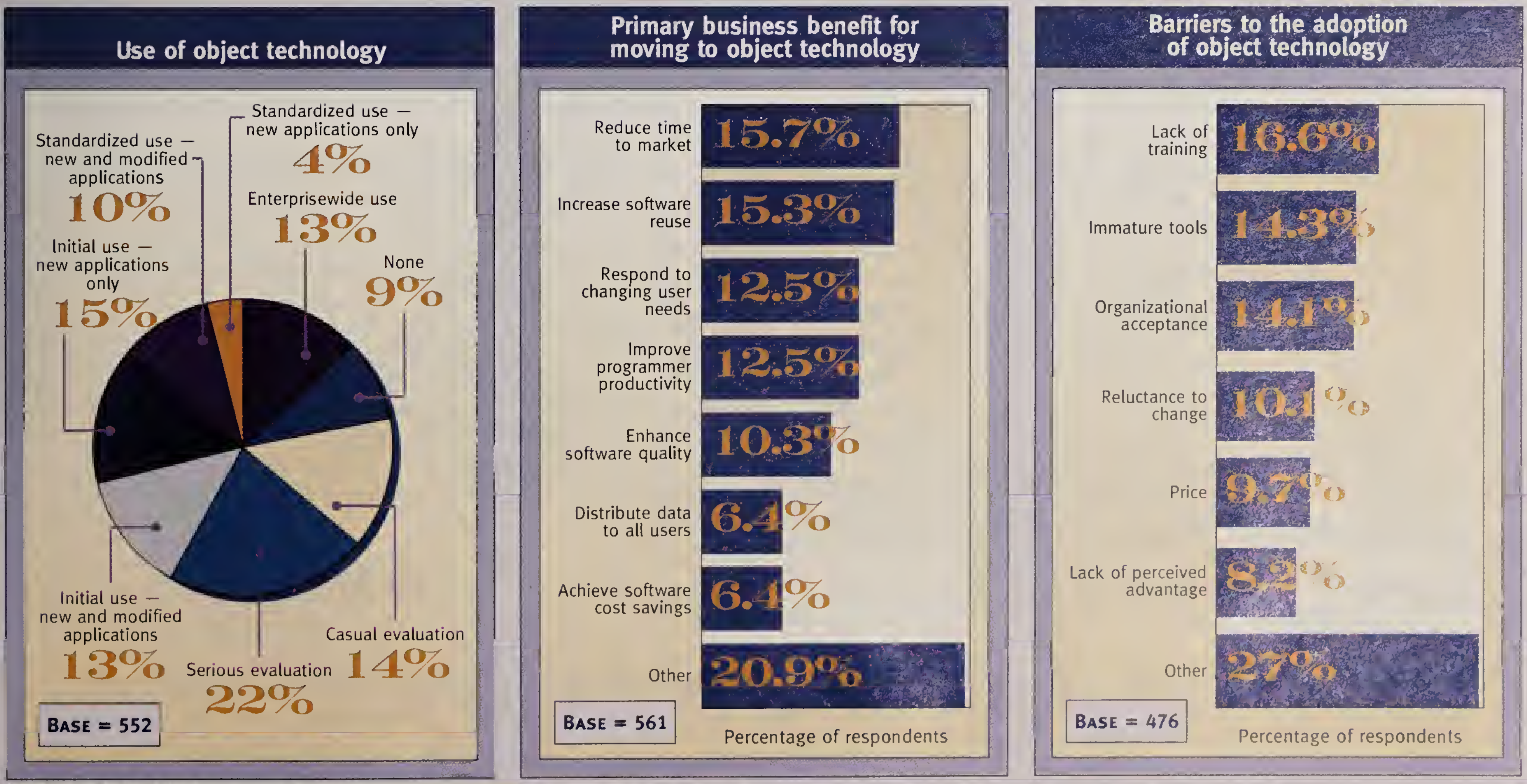
Gupta's SQLWindows 5.0 is due to ship before July 31, while Uniface 6.0 for Windows 3.1 is due out this month. Macintosh, OS/2 and various Unix versions are expected to ship in the third quarter, according to Uniface.

Senior writer Mary Brandel contributed to this story.

Money matters

- Gupta's SQLWindows 5.0 is priced at $3,395 for a so-called corporate edition, which includes interfaces to computer-aided software engineering tools, a compiler and team programming facilities. A network edition, which is a subset of the corporate package, is priced at $1,995.
- Uniface declined to specify pricing for Uniface 6.0.

Although many people are dabbling with object technology in some form, there are both advantages and disadvantages to doing so



Source: Market Perspectives, Inc., Framingham, Mass.

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KnowledgeWare sets sights on end users

By Melinda-Carol Ballou

KnowledgeWare, Inc. is moving beyond its traditional bread-and-butter market of developers with a re-engineering tool for end users.

Dubbed Maxim, the tool lets users visually structure their business processes and the relationships between groups involved with those processes, according to early users of the product. This tool has been expected for some time [CW, April 18].

Jim Johnson is project leader at Williams International, an aerospace manufacturer in Walled Lake, Mich., and a beta test site using Maxim to re-engineer the company's order-entry system.

Maxim is a model-based graphical environment that includes a workflow diagrammer and an organizational flow diagrammer. An interface to KnowledgeWare's Application Development Workbench (ADW) computer-aided software engineering tool is also available. It will allow developers to create applications built on the workflow and organizational models developed with Maxim, company officials said.

Time and cost measurements can be associated with each step of a business process, they added, and can then be exported to spreadsheets such as Lotus Development Corp.'s 1-2-3 or Microsoft Corp.'s Excel.

Johnson said he is using Maxim to graphically depict Williams International's business processes and prototype them. "It helps me to see who deals with what, who the players are and what each one does over a certain time frame.

"Two departments might be doing the same thing at the same time or sequentially. I can diagram that, bring it to users who can see the whole picture for the first time and say, 'Oh, really,' then identify where to improve the process by getting rid of an unnecessary approval loop, for instance," he said.

Johnson, however, is a developer—not the real target audience for Maxim. At this point in Maxim's life cycle, analysts said, it may be too difficult for end users to work with the product.

"It has to be intuitive and fun enough so that people will use it, and at this point, it's really for more technical users," said Judith Hurwitz, president of Hurwitz Consulting Group, a Watertown, Mass., consulting firm.

Maxim is shipping this month with an introductory price of $249 and a final retail price of $499. The ADW interface will ultimately be priced at $1,899 but is currently priced at $1,599.

Briefs

Revenue boost

Micro Focus, Inc. announced last month that company revenue for the first quarter of this year increased by 24% to $30 million, compared with $24.3 million for the same period last year. Net earnings rose to $2.9 million from $2.3 million last year. Also this year, Micro Focus acquired the consulting division of **The Systems Group** in Hartford, Conn. Company officials said they expect those consultants will let the company increase training resources and revenue related to services.

Oracle gets good grades

Ovum Ltd., a London research and consulting firm, rated **Oracle Corp.**'s Cooperative Development Environment as the best overall fourth-generation language in an evaluation completed earlier this year. The study evaluates reports and forms generation, code generation from text entry and batch programs generation, as well as support for transaction processing monitors and development utilities.

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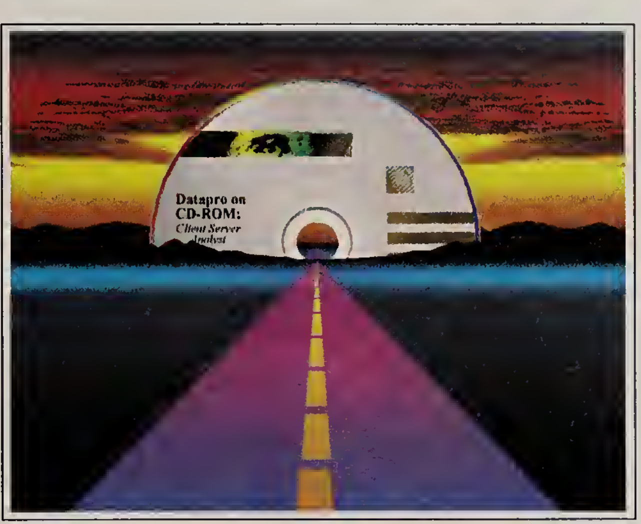
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New Products

Asymetrix Corp. has introduced ToolBook 3.0, a visual programming system, and Multimedia ToolBook 3.0, a multimedia authoring system.

According to the Bellevue, Wash., company, the products were designed for visual software developers of front ends and prototypes; authors of computer-based training, hypermedia and information-kiosk applications; and CD-ROM publishers.

ToolBook 3.0 contains a book metaphor and object orientation to provide an environment for the development of interactive applications.

Multimedia ToolBook 3.0 contains the same features as ToolBook 3.0 and adds a multimedia engine, path-based animation and full-motion video editing.

ToolBook 3.0 costs $195, and Multimedia ToolBook 3.0 costs $895.

▶ *Asymetrix*
(206) 462-0501

Bluestone Communications, Inc. has announced a commercial implementation of OSF/Motif 1.2.4 and seven versions of UIM/X, a graphical user interface development tool for OSF/Motif.

According to the Mount Laurel, N.J., company, the products are built for Sun Microsystems, Inc.'s SPARC workstations. The seven UIM/X versions are UIM X 2.6, UIM/X Cross Platform Toolset, UIM Xtend Deluxe, UIM/Ada, UIM XMove, Visual Action Toolset and XRT/table.

OSF/Motif 1.2.4 costs $99. The versions of UIM/X range from $500 to $11,000.

▶ *Bluestone Communications*
(609) 727-4600

Motorola, Inc. has announced plans to port the company's PowerPC microprocessor compilers to Apple Computer, Inc.'s Power Macintosh machines.

According to the Schaumburg, Ill., firm, the compilers will be fully compatible with the Macintosh Programmer's Workshop development environment and will let developers simultaneously optimize code for each member of PowerPC's family of microprocessors.

The compilers can be configured to optimize code for a particular chip implementation or generate a series of objects to target multiple PowerPC processors.

The compiler costs $349.

▶ *Motorola*
(708) 576-1600

Mercury Interactive Corp. has introduced PowerRunner, an automated software quality system.

According to the Santa Clara, Calif., company, the product was designed to improve the quality of client/server applications developed using Powersoft Corp.'s PowerBuilder.

PowerRunner can identify PowerBuilder custom objects, automatically verify the data behind DataWindows, verify drop-down objects and use logical names assigned by PowerBuilder.

PowerRunner costs $2,850.

▶ *Mercury Interactive*
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Product shorts

Interactive Software Engineering, Inc. has introduced Personal Eiffel for Windows, an object-oriented development environment. The product includes a compiling technique that supports fast incremental compilation. Cost: $49. Interactive Software Engineering, Goleta, Calif. (805) 685-1006.... **Bytel Corp.** has announced Genifer Version 4.01, an XBase generator that lets developers create multiwindow, multifile relational database applications. The product automates the entire development process with XBase-specific templates to speed application generation. Cost $395. Bytel, Berkeley, Calif. (415) 527-1157.

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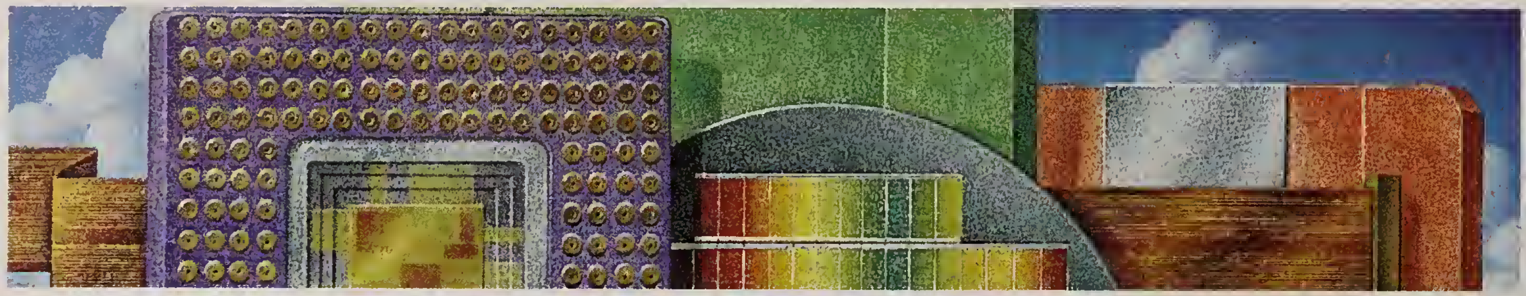

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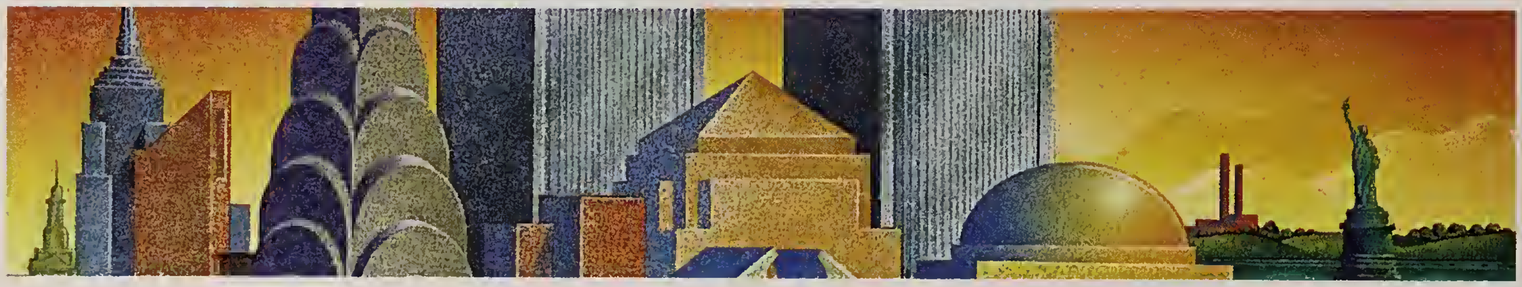

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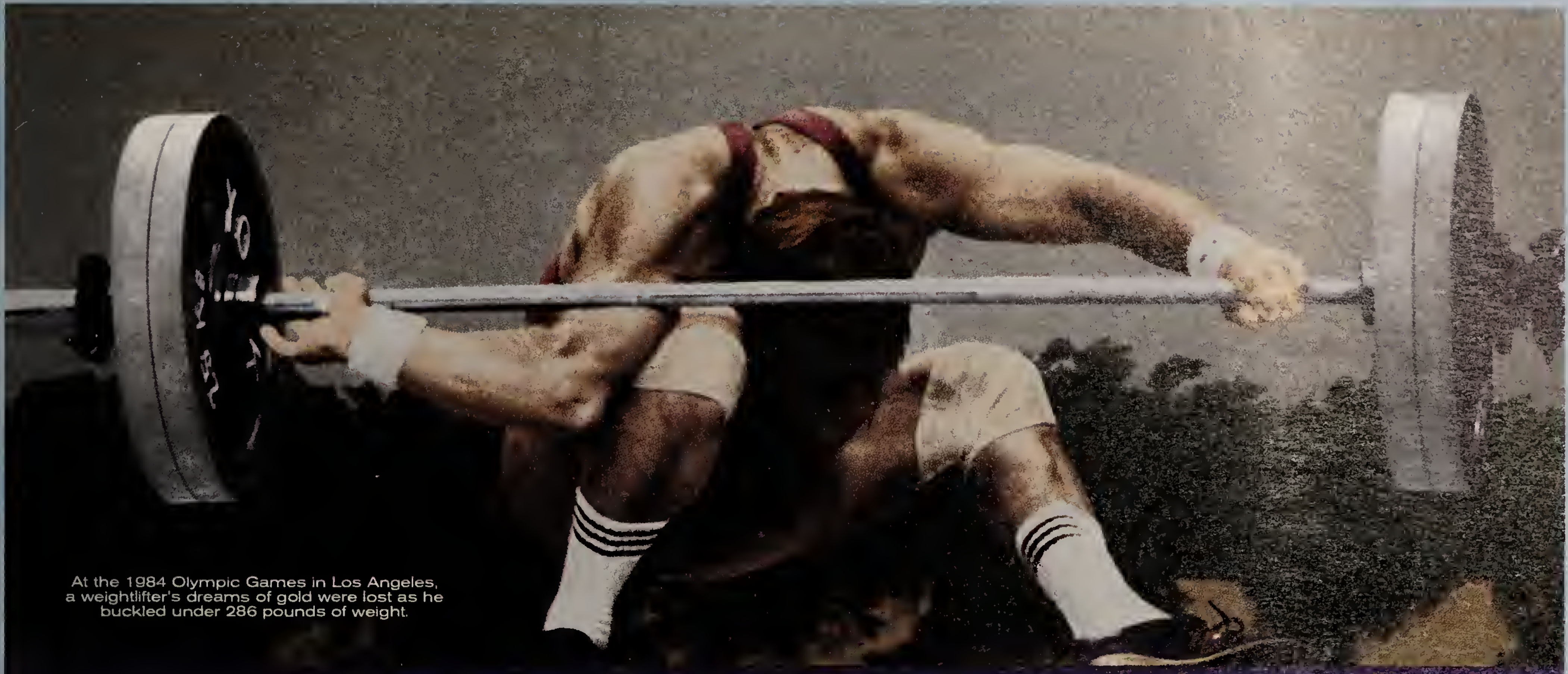

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CIO FOR HIRE

BY MELANIE MENAGH

Many companies no longer feel the need for a permanent chief information officer, and many CIOs are longing for challenging work with a minimum of political hassles. Temporary CIOs can be a win-win solution.

After being chief information officer at Frito-Lay, Inc. for 11 years, Charles S. Feld could easily see himself becoming the "grand old man of Pepsico."

And no wonder: Feld had a very successful career at Frito-Lay. His work there even helped win the company a *Computerworld* Smithsonian award and a Carnegie Mellon University/American Management Systems award.

But rather than grow old in service to his company, Feld decided to seek new challenges and adventures. So he left Frito-Lay and entered the uncertain world of the wandering CIO.

Feld is one of a small breed of CIOs — the CIO for hire — who travel from organization to organization, staying only long enough to put a new system in place, manage a specific project or revamp the department.

As firms reduce their nucleus of permanent employees, some companies are deciding they don't need a senior information systems person on the payroll permanently. They are hiring temporary CIOs to accomplish specific tasks.

"I get calls for more work than I can handle," Feld says. "What companies are looking for when they want to hire a CIO to work on a particular project or for a specifically limited period is somebody with a proven track record. They want someone who has developed a reputation as a builder of systems and organizations rather than as a strategist," he says.

"There's a real scarcity of truly top IS people. [A company] may have bet on different CIOs two or three times, and two or three times, bet on the wrong person, whether they were wrong for political, technical or social reasons," says Feld, who is currently working at Burlington Northern, Inc. in Fort Worth, Texas.

But former Whirlpool Corp. IS chief Richard Koeller, president of Koeller & Associates in Chicago, says there are serious problems with CIOs for hire, not the least of which is the lack of allegiance between temporary CIOs and their staffs. An IS staff can feel little loyalty to a CIO who will leave in a few months or a year.

Companies should rent a CIO, Koeller says, when "they need immediate help, there's no one inside, and they can't, in their opinion, wait to hire somebody. If they are going to go this route, they should be making the judgment long-term that they don't want a CIO. Then, rent a CIO makes sense."

Koeller weighed this view carefully — having wrestled with the idea of becoming a rent-a-CIO himself — before venturing into consulting. "I was going to do it. Five years ago I was going to work for a Big Eight firm and do this boutique practice." But after deciding not to and having "watched it for five years, I don't believe it's there now. And I don't believe it will ever be."

Sometimes a good bet

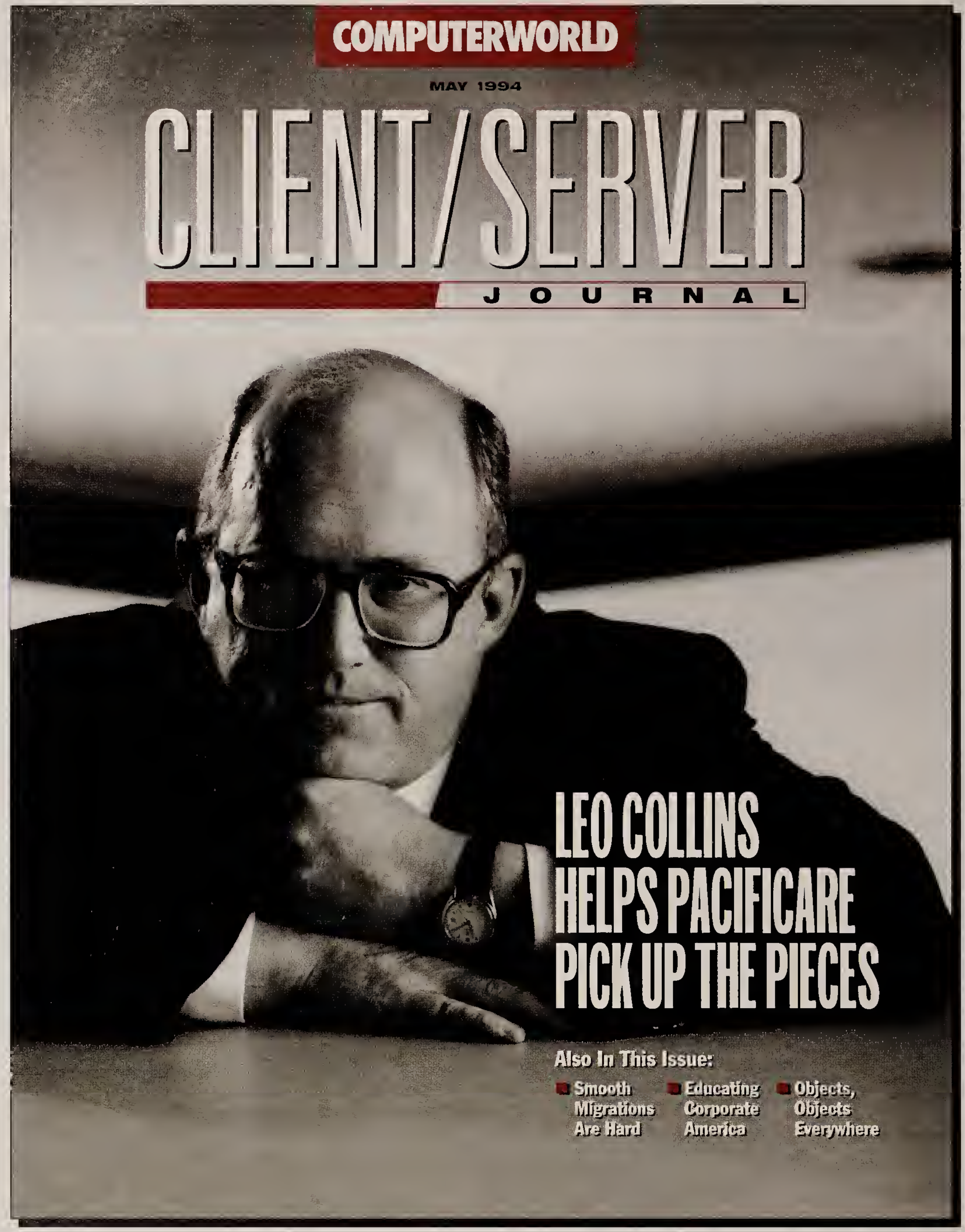
But there can be many practical and personal reasons for IS managers to test the temporary CIO waters.

These interim CIOs are often early retirees bridging the gap between their previous job and full retirement without making a long-term commitment, says John A. Thompson, chairman and founder of Imcor, an executive search firm in Stamford, Conn., and author of *The Portable Executive* (Simon and Schuster), due out early next year.

CIO for hire, *page 105*

"Companies are interested in hiring people like me on this interim basis for several reasons. There's a real scarcity of truly top IS people. They may have bet on different CIOs two or three times, and two or three times, bet on the wrong person, whether they were wrong for political technical or social reasons."

— Charles Feld, former CIO at Frito-Lay for 11 years and now a CIO for hire



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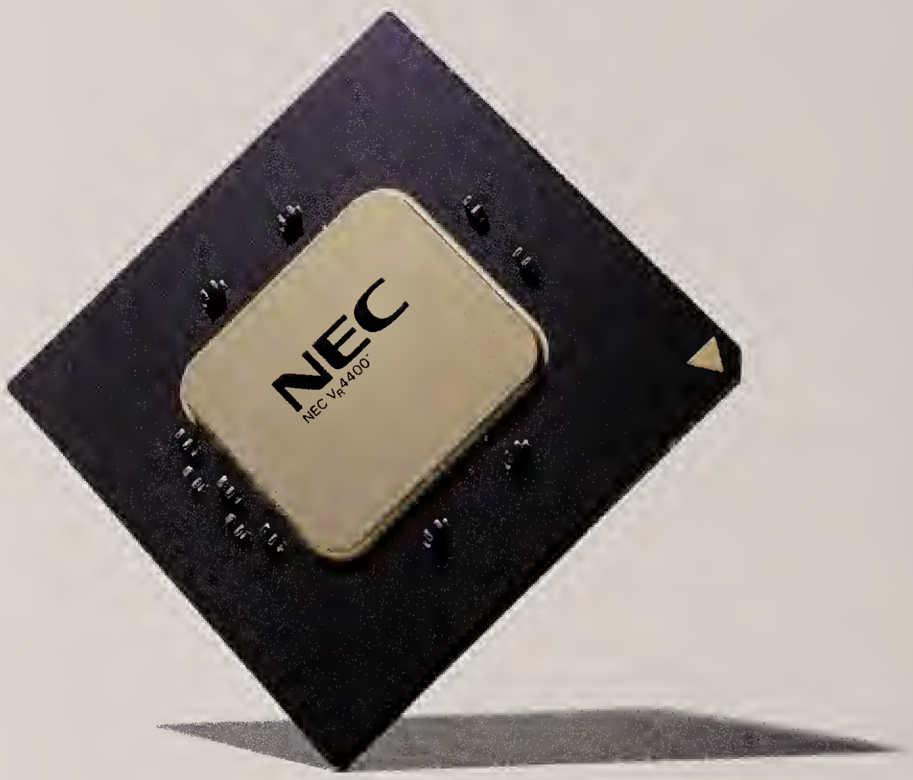

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And now, thanks to Windows NT, the same 64-bit brain that powers these machines can be right on your desk. Manipulating spreadsheets. Processing data. And, perhaps, even changing the course of history.

The reason Microsoft chose the MIPS RISC architecture is simple—raw, unadulterated speed. In fact, NEC's V_R4400 runs Windows NT almost twice as fast as Pentium®, and nearly four times as fast as the 486™ DX2/66.*

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If you're responsible for evaluating new PCs running Windows NT, look for the new V_R4400-based systems. They run faster, save you money and even let you use your existing DOS and Windows 3.1 applications.

If you want to discover more about our V_R-Series™ microprocessors, and to receive a list of systems vendors shipping V_R-Series based PCs, please call NEC Electronics Inc. at 1-800-366-9782. Or fax us at 1-800-729-9288 and ask for Info Pack #167. For information on NEC MIPS-based PCs, call NEC Technologies, Inc. at 1-800-NEC-INFO.

NEC

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Introduction

Never before in the history of business computing have buyers been bombarded with such a vast array of platform choices. Even for the majority of businesses, which have stuck with x86-based PCs running Microsoft DOS, there are more than 10 times as many versions of x86 as there were just four years ago. That is due not only to the faster pace of new chips coming from Intel, but also to the increased output of competitive x86 suppliers like Advanced Micro Devices (AMD), Cyrix, IBM, Texas Instruments (TI) and others.

And if that is not enough, portable operating systems like Windows NT are promising users the same graphical user interface (GUI) and applications across a wide variety of microprocessor platforms. As a result, performance RISC architectures — such as Alpha, MIPS, PA-RISC, PowerPC, and SPARC — traditionally found in engineering workstations and other specialized computers now merit attention in a wider spectrum of computing areas.

Although the array of options may seem overwhelming, it is possible to tackle it — and profit from it — by purchasing more computing power for the same amount of money. Specifically, there are three main areas for buyers to keep in mind as they consider new options:

- how much will the new hardware cost?
- how compelling are the native applications and OS environment?
- how well does the platform support your installed base of applications and data?

This white paper, which is an attempt to clarify some of these issues, represents a collaborative effort between Mercury Research and many of the world's leading suppliers of microprocessors: Advanced Micro Devices, Digital Equipment, Hewlett-Packard, IBM, NEC Electronics, Sun-SPARC Technology Business and Texas Instruments.

Mercury Research is a market research and consulting firm dedicated to providing insight into the markets for PC components and related hardware. In addition to tracking PC processor shipments and pricing, the firm's growing list of PC hardware-related databases includes PC chip sets, graphics components and PC configuration trends. Mercury Research was founded by Mike Feibus and Dean McCarron, two of the most consulted PC hardware analysts in the industry. Reach Mercury Research at 32444 North 66th Street, P.O. Box 13660, Scottsdale, AZ 85267-3660. Phone (602) 488-1263 Fax (602) 488-3233, E-mail: 556-8985 @mcimail.com.

ILLUSTRATION BY MARK S. FISHER

The Dawn of Choice:

Processor Alternatives Herald New Era in Computing

In many ways, the state of buying a computer today is very similar to the chaos that stymied the telephone equipment and services market a decade ago, shortly after AT&T began chopping itself up into smaller pieces. Back then, buyers who were unaccustomed to choices for phones and long-distance service were confused by the myriad of options from competitive suppliers.

Confused and angry, mostly at Judge Harold Greene, the federal judge who mandated the AT&T breakup in the landmark antitrust case, many buyers at the time stuck with their age-old habits of buying long-distance service from AT&T and renting handsets from their local Baby Bell.

But ever so slowly, new features like redial, automatic dialers and cordless handsets — all high-quality and attractively priced — began to catch their eyes. And as competitive long-distance carriers improved their quality and service while still undercutting AT&T's prices, more and more consumers and businesses began testing the alternatives.

It took years, but buyers eventually found that they were getting significantly more, and paying much less, for communications products and services after the AT&T breakup. And when all was said and done, AT&T still maintained a dominant market share in both telephone equipment and long-distance services.

The computer market today is undergoing a similar, rocky transformation. As with the communications business in the 1980s, the chaos in the computer market is being stimulated by a massive infusion of choice. The walls that blocked competition in the PC processor market for more than a decade are crumbling, not because of a court mandate, but because of free market competition.

And as with telecommunications in the 1980s, buyers who take the time to understand the broadening horizon of options today will find that, once the dust settles, they are paying much less for much more power than they ever thought possible.

GOOD OLD DAYS?

In the last decade, the choice for most businesses came down to whose 286 system — and, later, whose 386 PC — to buy. For the most part, Intel was the only microprocessor game in town for mainstream business computing, although it did license the 286 to several competitors.

Apple's Macintosh was the platform of choice for desktop publishing, while Unix workstations dominated the market for CAD and other engineering applications. Both Macs and Unix computers at the time were powered by 680x0s from the "other" microprocessor vendor, Motorola.

Today the x86 architecture and semiconductor technology have matured to the point that competitive processor suppliers are able to introduce chips that can hold their own against Intel's offerings. AMD, Cyrix, IBM, Texas Instruments, and now NexGen, SGS Thomson and UMC all offer competitive x86 chips. For its part, Intel has struck back at the competition with an ever-quickening barrage of new processors and a host of price cuts. When the 386 was Intel's processor breadwinner, and the company had the market to itself, the price that PC makers paid for 386s declined by only about five percent per quarter. Today, Intel routinely slashes 486 prices by 15 percent to 20 percent per quarter, and sometimes even more for selected chips with intense competition. And the number of Intel processors available has multiplied, as well. At one time, Intel shipped only about a half dozen speeds of 286 and 386 processors combined. That was before it introduced the 386SX, which was arguably the first processor Intel designed with competition in mind.

Today, the company is shipping at least a dozen different versions of the 486 alone, and that does not include variants of many of those parts that feature esoteric bells and whistles for power management, such as dual-phase clocks and 3.3-volt power supplies. It also does not include four different Pentium options announced to date.

Combine that with another dozen or so 486s from Intel competitors, many with different names and features from Intel's parts, and buyers' choices start to get overwhelming. And then there are processors based on emerging RISC architectures. Although their impact on the mainstream has thus far been minimal, computers built around RISC architectures like Alpha, MIPS, PA-RISC, PowerPC, SPARC and others are slowly becoming viable options in servers and power desktop computers.

This is particularly true now that operating systems designed to run on them support a growing choice of applications as well as interoperability schemes that help ease the transition from the DOS-Windows world.

All of this confusion plays right into Intel's hands, at least for the time being. Buyers who are overwhelmed by the tidal wave of processors typically don blinders to block out the alternatives, only buying familiar systems. Not surprisingly, these systems come from Intel, the world's largest microprocessor vendor.

Now, however, more and more buyers are peering around their blinders and gradually broadening their decision-making horizons, just as they did with telecommunications products a decade ago.

Bargain hunters have been the first buyers to run into PCs powered by x86 processors from Intel competitors like AMD or Cyrix because their systems typically cost less for two reasons. First, competitive x86s more often than not sell to computer makers at a discount, and that lowers the cost of the PCs. Second, discount brands have been the first to take a chance on alternatives to Intel. The premium brands like AST, Dell and IBM have shied away from non-Intel chips, adding to the mystique that competitive processors are somehow riskier.

Intel has done a good job furthering this alarmist notion in the marketplace. It has spent millions on a years-long promotion designed to instill the fearful thought in end users' minds that PCs need an "Intel Inside" logo to ensure worry-free compatibility. Of course, there have been no compatibility problems with any of the x86 competitors to substantiate those fears, and there is no reason to believe that there will be in the future. So it is natural to assume that the competitors' bargain-rack image will continue to approach Intel's level over time.

EARTH-SHATTERING NEWS

The processor world's biggest news this year is a good example of an Intel competitor hitting it big. Compaq announced that it intends to use AMD

Compaq will go a long way toward shattering Intel's higher-end image once it begins shipping its computers with AMD processors.

FIGURE 1

Popular Microprocessors and Their Specifications

Processor	Suppliers	datapath	L1 cache	FPU?	a clock/ i clock (MHz)
486SX-25	Intel, AMD	32-bit burst mode	8K bytes	no	25/25
486SX-33	Intel, AMD	32-bit burst mode	8K bytes	no	33/33
486SX-40	AMD	32-bit burst mode	8K bytes	no	40/40
486SL-25	Intel	32-bit burst mode	8K bytes	yes	25/25
486SL-33	Intel	32-bit burst mode	8K bytes	yes	33/33
486DX-33	Intel, AMD, Cyrix	32-bit burst mode	8K bytes	yes	33/33
486DX-40	AMD, Cyrix	32-bit burst mode	8K bytes	yes	40/40
486DX-50	Intel, AMD, Cyrix	32-bit burst mode	8K bytes	yes	50/50
486SX2-50	Intel, AMD	32-bit burst mode	8K bytes	no	25/50
486SX2-66	Intel, AMD	32-bit burst mode	8K bytes	no	33/66
486DX2-50	Intel, AMD, Cyrix	32-bit burst mode	8K bytes	yes	25/50
486DX2-66	Intel, AMD, Cyrix	32-bit burst mode	8K bytes	yes	33/66
DX4-75	Intel	32-bit burst mode	8K bytes	yes	25/75
DX4-100	Intel	32-bit burst mode	8K bytes	yes	33/100
486SLC-25	Cyrix, TI	16-bit	1K bytes	no	25/25
486SLC-33	Cyrix, TI	16-bit	1K bytes	no	33/33
486DLC-33	Cyrix, TI	32-bit	1K bytes	no	33/33
486DLC-40	Cyrix, TI	32-bit	1K bytes	no	40/40
486SXLC2-50	TI	16-bit	8K bytes	no	25/50
486SXL2-50	TI	32-bit	8K bytes	no	25/50
486BL-75	IBM	32-bit	16K bytes	no	33/100
486BL-100	IBM	32-bit	16K bytes	no	25/75
486SLC2-50	IBM	16-bit	16K bytes	no	25/50
486SLC2-66	IBM	16-bit	16K bytes	no	33/66
486SLC2-50	Cyrix	16-bit	1K byte	no	25/50

In the 486 world, the major differentiators between competitive chips are the data path to memory, the size of the internal cache, the presence of a floating-point coprocessor, the internal clock rate and the external clock rate. Notebook buyers should note that many 486s come in 3.3-volt versions, which means they consume less power than five-volt parts.

SOURCE: MERCURY RESEARCH

The market will increasingly tolerate change and choice, leading to an erosion of Intel's market share over the next few years.

processors in upcoming computers. Compaq will go a long way toward shattering Intel's higher-end image once the company begins shipping them, an occurrence that is likely to transpire by the time this white paper is distributed.

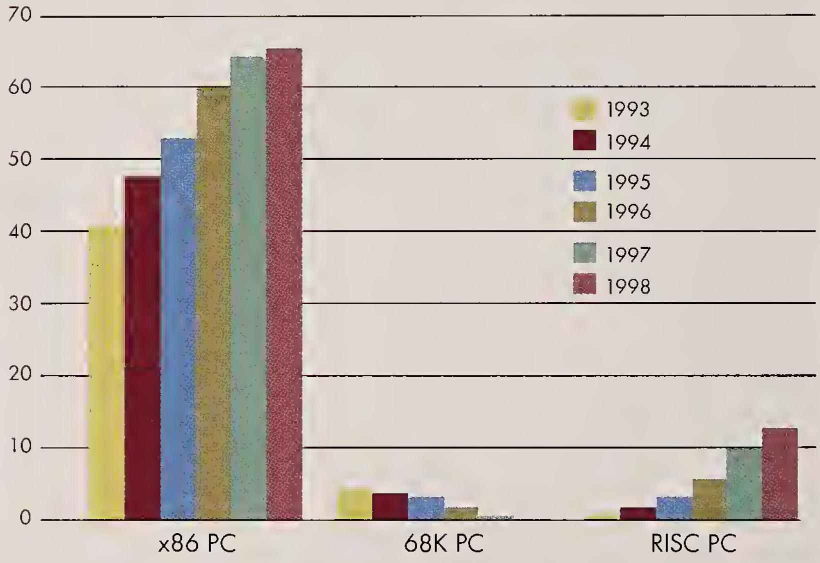
Compaq is not alone in giving a nod to an Intel alternative. In fact, each of the four largest PC makers has done so during the past few months: Compaq, Apple, IBM and NEC.

Apple began shipping the first PowerPC Macintosh computers, which are powered by the RISC processors that IBM and Motorola developed.

For its part, IBM also announced that it would be making Cyrix's x86 chips, and has the right to sell them under its own name to the IBM PC Co., and other computer makers. IBM's move not only affords Cyrix credibility, but also gives the Texas startup access to IBM's top-of-the-line chip manufacturing facilities, something Cyrix needs if it is going to challenge Intel's flagship Pentium chips.

FIGURE 2

Millions of Microprocessor Units Shipped 1993-1998 (Actual and Projected)



The x86 processors still dominate the PC world, with nearly 90 percent of all shipments. As Apple moves its Macintosh family to the PowerPC line, and as other RISC processors use portable operating systems like Windows NT to spring into the mainstream, RISC will gradually take a larger share of market.

SOURCE: MERCURY RESEARCH

Finally, NEC Technologies announced new computers based on MIPS architecture processors. The new systems, which start at $3,800, come in both server and personal workstation configurations.

STILL INTEL INSIDE?

To be sure, these announcements, and future moves that undoubtedly will follow, combine to put competition on a more equal footing in the battle against Intel. Moreover, the market will increasingly tolerate change and choice, meaning competitors will continue to erode Intel's market share over the next few years. The x86 alternatives should take share first, simply because they are in a position to use the installed base of software.

But when all is said and done, more buyers will walk away with PCs run by Intel chips than any other kind — a situation that will hold true for years to come. The reasons are simple: the x86 architecture is still the only sensible choice for the DOS and Windows users who make up nearly 90 percent of all computer users in this country, and Intel offers far more x86 variants than any other vendor.

As mentioned, Intel has about 12 different 486s available today, ranging from the 486SX-25, a 25 MHz processor with 8K bytes of cache built in but no internal floating-point coprocessor, all the way up to the DX4-100, a clock-tripled chip that runs at 100 MHz internally, and includes 16K bytes of cache and a built-in floating-point coprocessor.

AN x86 IS AN x86

The characteristics that distinguish Intel's 486 line — the internal cache, the floating-point coprocessor, the processor's clock speed and whether the chip is clock-enhanced — also serve to mark the competition. In fact, 486 products from AMD, Intel's largest x86 competitor, are virtual duplicates of Intel's, with one exception: The company does not yet offer processors to compete with Intel's new high-end DX4s. That is rumored to be in the works, however.

AMD's one shot at differentiation in the 486 market — the 486SX2, a clock-doubled chip with 8K bytes of cache but no floating-point unit — was foiled in March when Intel announced the same chip a week later. However, neither company's SX2 should make a big splash in the market because prices for DX2 chips are falling so rapidly.

POISED TO MOVE

Industry observers expected both AMD and Cyrix, the next largest competitor, to make a larger dent in Intel's share by now. However, both have been hampered by manufacturing constraints. AMD's plants are flat-out and commitments for other chips have thus far prevented the company from switching more of its capacity to 486s. That should change next year, thanks to a massive new plant being built in Austin, and to a manufacturing arrangement that will have Digital Equipment building 486s for AMD by year end.

As for Cyrix, legal problems with one of its two prime chip-building partners, and manufacturing problems at the other, prompted the company to shop around for a new manufacturer (Cyrix does not make its own chips). It found an able partner, announcing a deal with IBM in April.

Buoyed by this new manufacturing arrangement with IBM, Cyrix is emerging as a serious competitor to AMD's and Intel's 486 offerings, particularly with its Cx486DX-33 and the clock-doubled Cx486DX2-50. A DX2-66 is also reported to be imminent.

As for IBM, the pact frees Big Blue to sell Intel-compatible processors on the open market. But IBM has been at least an indirect competitor already with its 486SLC2s and Blue Lightning chips. As part of an agreement with Intel to use elements of its x86 design, IBM may not sell those chips by themselves — they must be part of a system or subsystem.

As it happens, other PC vendors, most notably Diamond Technologies, are buying SLC2 and Blue Lightning motherboards to include in their own systems. Of course, Ambra, IBM's discount brand subsidiary, and IBM proper, are also selling Blue Lightning-based PCs.

Like Cyrix's earlier 486s, IBM's offerings stick with 386 data paths, so the clock-doubled SLC2s and clock-tripled Blue Lightnings do not exploit improvements Intel made with the 486. However, both include 16K bytes of cache, compared with Intel's 8K bytes. Blue Lightning, which started shipping last summer, was the first clock-tripled x86 processor available in PCs. The first chips worked at 75 MHz internally and communicated with the system at 33 MHz. The company now ships 100 MHz Blue Lightnings as well.

ENTER PENTIUM

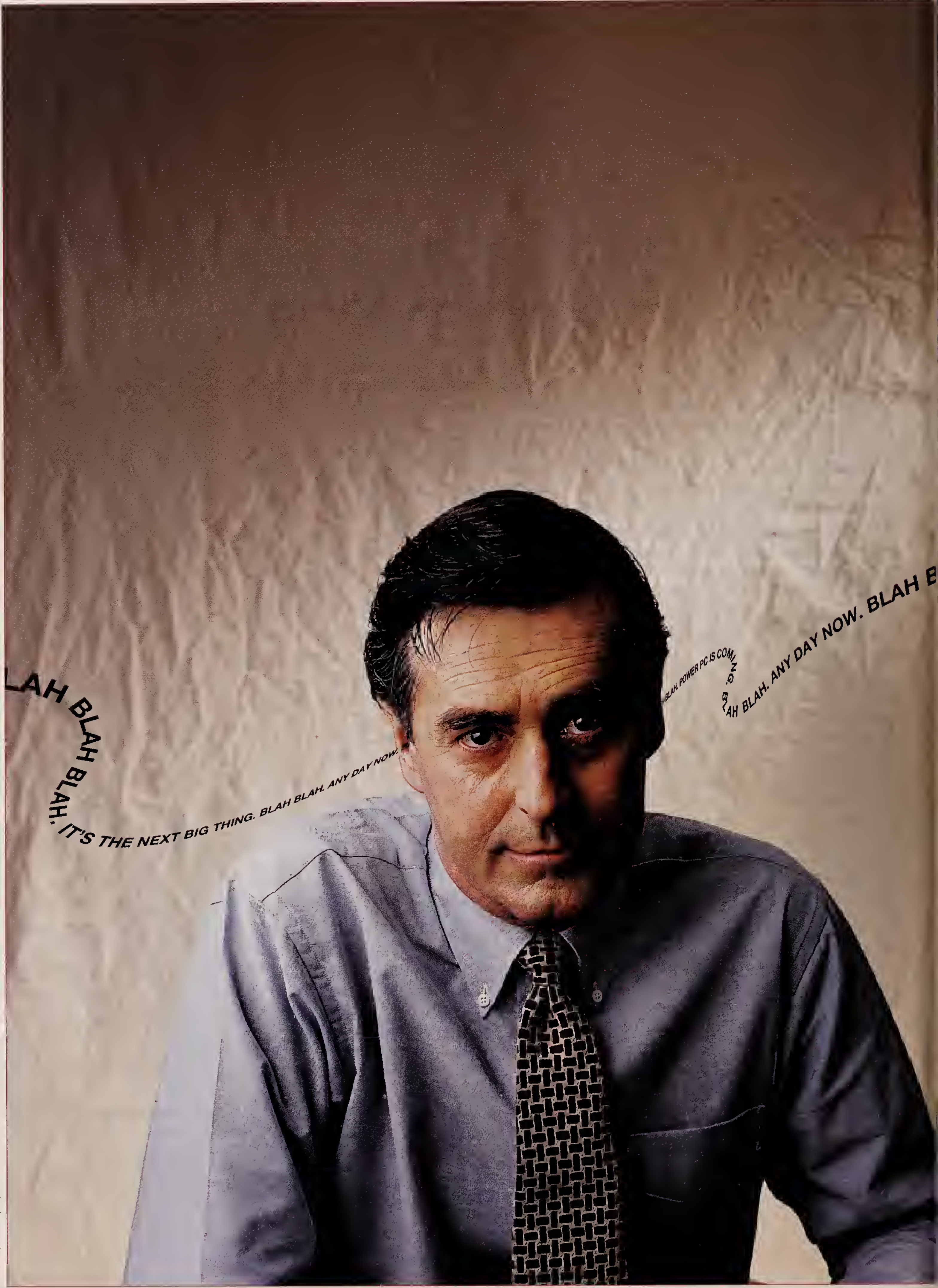
Almost exactly a year ago, PC makers began shipping the first systems based on Intel's fifth-generation x86 processor, Pentium. Flustered because it lost a legal bid to keep competitors from naming their chips 386s, 486s, 586s and so on, Intel decided to try out a new nomenclature. Thus the name "Pentium."

Most of the improvements to the architecture over the 486 came in its floating-point unit, an indication that Intel was at least as concerned about preempting the massing RISC competitors as it was with AMD or Cyrix. The floating-point coprocessor is approximately three times as proficient as the 486 itself.

For typical DOS and Windows users, Intel promises up to an 80 percent improvement in performance over a 486DX2-66. Most users experience significantly lower performance boosts, however. That is because Intel made Pentium a two-way superscalar chip, which means it has the ability to handle up to two instructions at the same time. In practice, however, it is rare for two instructions to process simultaneously. More often than not, one of them needs the result of the other before it can begin.

Intel is anticipating that software suppliers will recompile their applications

Buoyed by this new manufacturing arrangement with IBM, Cyrix is emerging as a serious competitor to AMD's and Intel's 486 offerings, particularly with its Cx486DX-33 and the clock-doubled Cx486DX2-50. A DX2-66 is also reported to be imminent.


LAH BLAH BLAH. IT'S THE NEXT BIG THING. BLAH BLAH. ANY DAY NOW. BLAH. POWER PC IS COMING. BLAH BLAH. ANY DAY NOW. BLAH B

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Update

◆

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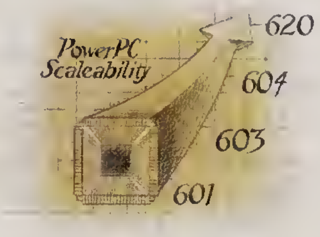

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Notebook Computers: An Intel Achilles Heel?

Microprocessor vendors challenging Intel have found this dominant x86 player to be most vulnerable in the notebook computer market.

In particular, Cyrix and AMD, which pioneered many power management features aboard standard processors — low-voltage operation, systems management mode and static operation — have given Intel a run for its money in notebooks. Intel has responded by making those features standard on all of its 486s as well as its newer Pentium chips.

Until recently, when the market began shifting to full-fledged 486s, Cyrix and Texas Instruments (TI) were successful in the notebook and subnotebook PC markets, selling their 486SLCs and 486DLCs. These chips include Cyrix's 486 core with 1K byte of cache and 386SX and 386DX data paths, respectively. As part of a controversial agreement with Cyrix that is now bogged down in litigation, TI is making its own spinoffs of the Cyrix parts. Last fall, the company introduced the 486SXLC2, a clock-doubled 486SLC with 8K bytes of cache. Cyrix is making a similar clock-doubled part, called the 486SLC2.

Buoyed by the success of the 486SLC in the notebook market, TI has also disclosed that it will be making a highly integrated version of the 486SXLC2 for mobile PCs. The part, code-named "Rio Grande," is a clock-doubled chip with 8K bytes of cache and includes memory control and PCI local-bus interfaces on board. The chip is not yet available, although it is expected to begin showing up in notebook PCs by year end.

Indications are that Intel is reticent about following TI or any other competitor that integrates system functions onto its processors, and the rumor is that at least AMD is working on a similar, highly integrated processor, as well.

In fact, Intel already offers an integrated 486, called the 486SL. The 486SL includes an 8K byte cache, as well as memory control, power management features and an AT bus interface. The company announced the SL, which is available in speeds of 25 MHz and 33 MHz, in late 1992. Much to the dismay of computer makers, Intel disclosed a few months later that it would not be introducing clock-doubled 486SLs, or any new versions of the SL, for that matter.

Although Intel has never said so publicly, it is widely believed that the company clipped the 486SL because the chip was cutting into profit margins. Intel's bread-and-butter business is selling 486s that cost several hundred dollars apiece. Although the 486SL chip is roughly twice the size of the 486DX, Intel was only able to charge a fraction more for it. Nevertheless, if TI and other competitors prove wildly successful in the notebook market, Intel will have to rethink its SL strategy.

when they perform updates to improve the likelihood that Pentium can handle two instructions at once. If and when that happens, the company says that performance will climb as much as 80 percent above DX2-66 levels.

In March, Intel gave Pentium performance a boost all its own by introducing 90 MHz and 100 MHz Pentiums. Together with the DX4-75 and DX4-100, the new Pentiums are made at Intel's newest manufacturing facilities. That helps the chip reach the new speeds, and helps them run cooler too.

Only one competitor has announced a Pentium-class processor to date: startup NexGen. The company, which is relying on IBM's massive chip-making facilities for production, says it plans to begin shipping Nx586s to PC makers in volume by early June. The chips will be available with 60 MHz and 66 MHz speeds, with even faster versions planned. According to NexGen, the chip performs on a par with a Pentium running at comparable speeds.

No one can predict what the future holds for NexGen, primarily because there are still too many unanswered questions about the company and its product. For one, the Nx586 has yet to prove itself reliable and compatible in the marketplace. And no one knows how far NexGen will be able to push its unique architecture. Can it reach the 100 MHz level that Intel has just announced? Will it be able to move beyond that to 125 MHz or 150 MHz?

Assuming NexGen's chip passes muster, its ability to succeed in 1995 will clearly be affected by competitive Pentium-class chips expected from Cyrix and AMD. Although Cyrix's Pentium-class chip, code-named M1, is still under wraps, the company has allowed some sneak peeks at the architecture. One of the most significant aspects of the chip is that, unlike Pentium, it will not need recompiled software to reach its peak performance. Through design techniques called "out-of-order execution" and "speculative execution," Cyrix engineers have improved the likelihood that the two-way superscalar device will process two instructions at once.

The announcement that IBM will be making the M1 for Cyrix eliminated the biggest question about this chip. In fact, with both IBM and Cyrix selling M1s, it may become a serious contender once it starts shipping next year.

Details of AMD's Pentium-class competitor, code-named K5, continue to dribble out. The company says that the K5 is a 64-bit, four-issue design, which means it can execute up to four instructions per cycle. In addition, AMD says the new chip implements techniques such as out-of-order execution to boost performance. The company also says that the first K5 chip will be available at about the same time as Cyrix's M1, and will meet or beat the best Pentium performance.

A HOST OF RISC COMPETITORS

For several years now, there has been an ongoing philosophical battle raging between suppliers of x86 processors and a new wave of processors based on RISC design methodologies. The RISC chips, proponents argue, do not have to maintain compatibility with the aging x86 architecture, and that enables them to easily outclass anything that Intel and the others throw their way.

In raw processor performance terms, their assertion holds water. For example, Intel's Pentium processor takes up a third more circuitry than a competitive RISC chip, the MIPS R4400. Now that Intel is shipping its new 100 MHz chip, Pentium finally matches the R4400 on integer performance.

But the RISC chip still significantly outperforms Pentium on floating-point performance, and it has been shipping since early 1993, six months before Intel started delivering the first Pentiums. The 200 MHz R4400, expected within the next month should reassert its overall edge over Pentium.

Even though the RISC camp usually wins the performance debate, the x86 suppliers win when it comes to sales. Why? Because while x86 baggage puts a drag on speed, it also instantly qualifies a processor to run the DOS and Windows programs that nearly 90 percent of all users on this continent work with on a daily basis.

Simply put, raw performance at an attractive price is only one component of the recipe for luring business users. The others: a compelling choice of applications that offer significant benefits over the status quo, and a relatively painless way to make the transition from the status quo to the new platform. Virtually all of the alternatives offer reliable emulation solutions for running DOS and/or Windows programs, so that does not present a stumbling block for any of the architectures.

SOFTWARE STRATEGIES

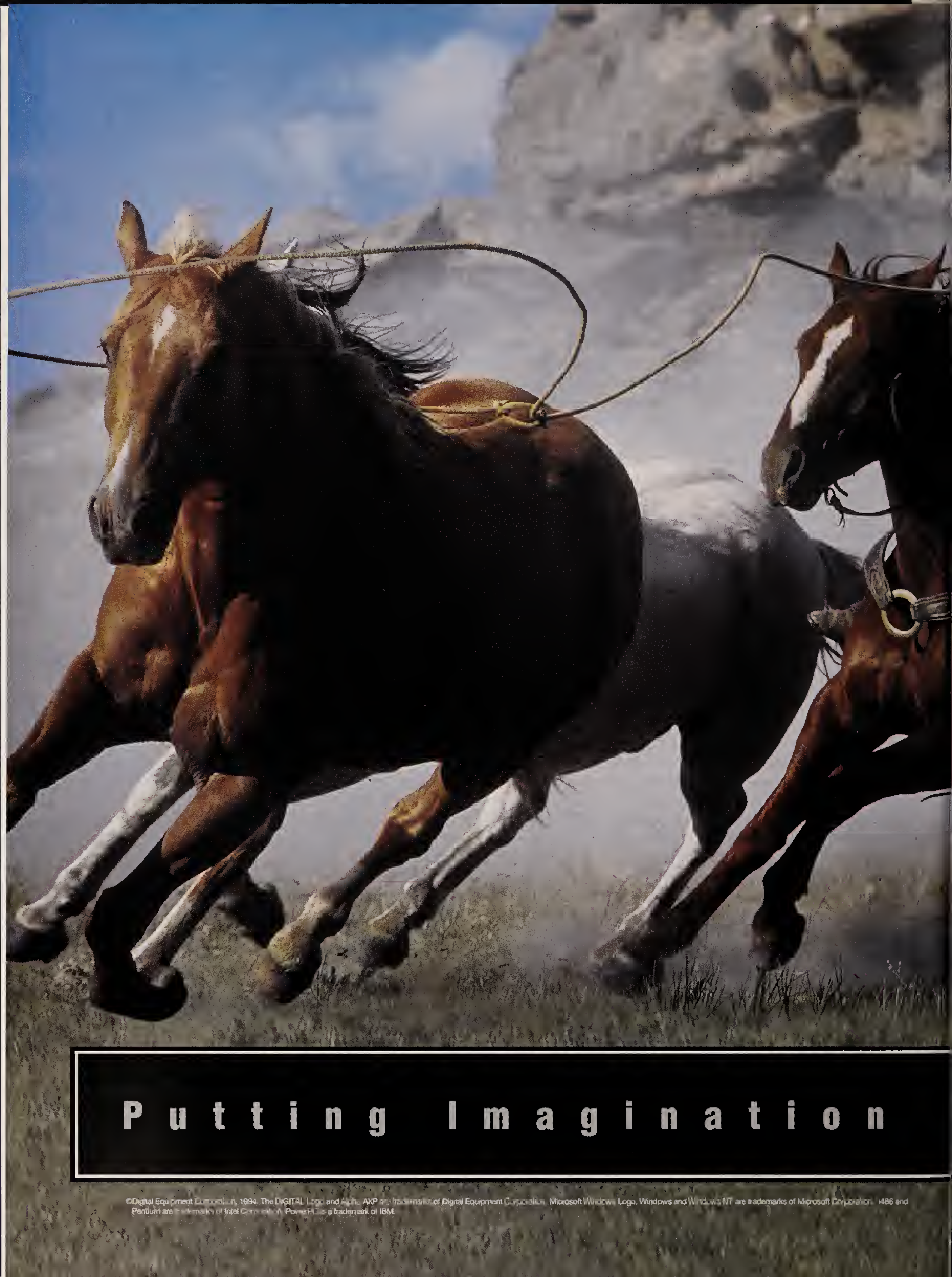
While backers of the RISC architectures hold out high hopes for garnering a significant chunk of the mainstream computing market, most of their strategies focus on exploiting an inherent advantage in their architecture in order to carve out a segment of the computing market. As for the mainstream, many of the architectures are rallying their hopes around Microsoft's Windows NT, a portable, 32-bit follow-on to the 16-bit DOS-Windows combination.

Thus far, NT can run on systems based on x86, MIPS and Alpha processors. NT has also been promised for the PowerPC, and more platforms are reported to be in line, including Sun Microsystems' SPARC architecture and the PA-RISC architecture from Hewlett-Packard (HP).

Certainly, the RISC vendors are not just waiting for NT to catapult them into the mainstream. IBM and Motorola, for example, have several mainstream operating system thrusts in action for the PowerPC architecture. In addition to the NT port, IBM is building its own operating system — tentatively named Workplace OS — for the PowerPC. Workplace OS, which IBM says it plans to deliver this summer, is supposed to be a micro-kernel that runs OS/2, DOS, Windows and other "personalities."

But without a doubt, the OS with the most potential for the PowerPC is Apple's System 7. In many ways, System 7 is superior to DOS and Windows, and is sup-

For several years now, there has been an ongoing philosophical battle raging between suppliers of x86 processors and a new wave of processors based on RISC design methodologies.



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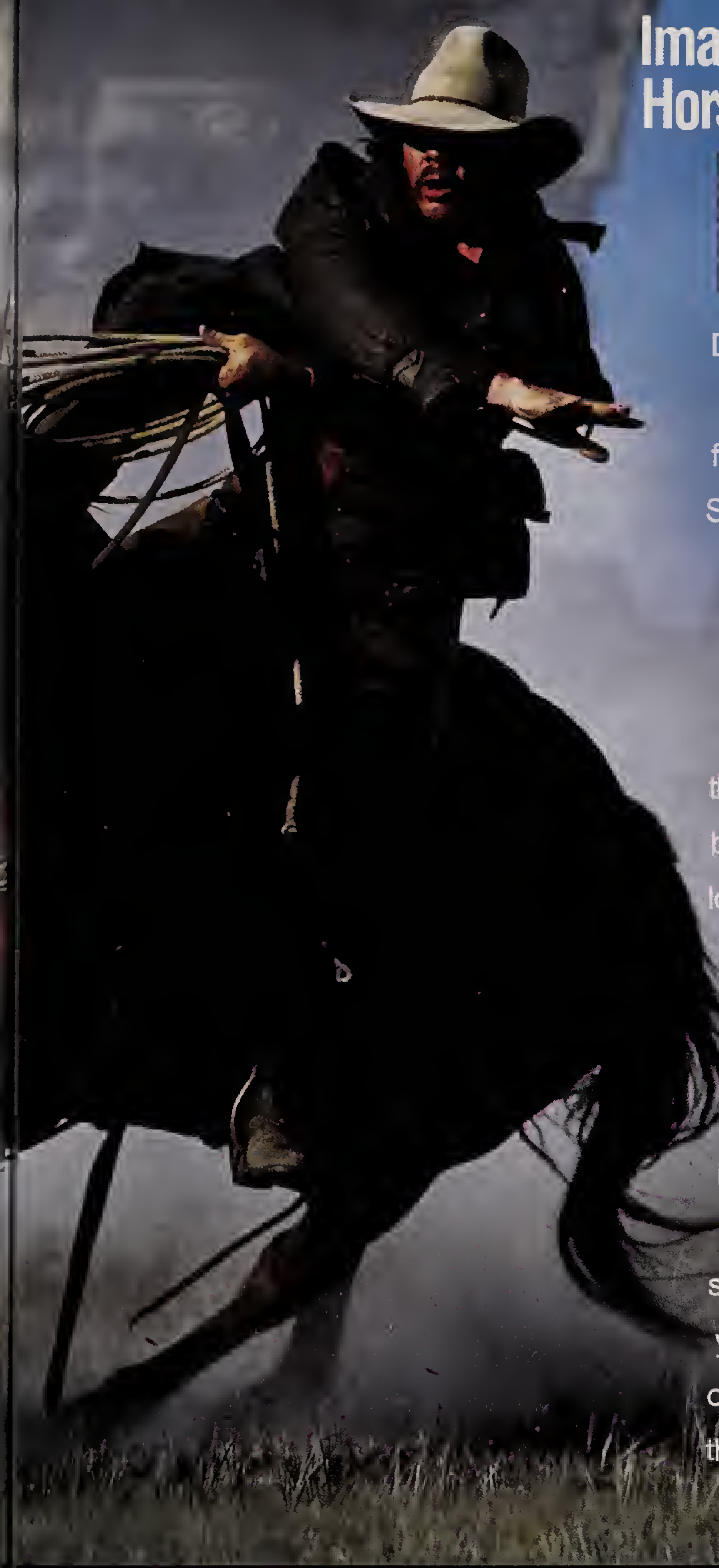

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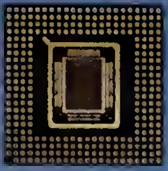

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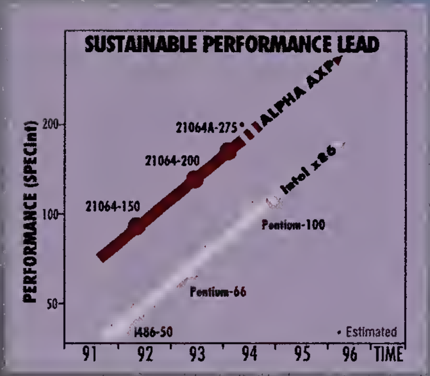

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Due to the collaborative effort of IBM, Motorola and Apple, the PowerPC is an odds-on favorite to grab a significant chunk of the mainstream market.

ported by a host of popular applications. System 7 commands nearly 10 percent of the PC market today, and Apple is the only PC supplier selling computers built around it. If Apple licenses the OS to other PC vendors — the company claims it will, although many observers have grown skeptical — then the PowerPC will have a powerful vehicle for grabbing a noticeable share of the x86 market.

Virtually all of the RISC architectures have a significant edge in floating-point performance over x86 processors. Although most business applications today rely heavily on integer operations, the proliferation of the RISC platforms is sparking a new era of applications developed to exploit their floating-point prowess.

Beyond their common advantage, each of the RISC suppliers brings unique advantages to the market, advantages based not only on their architectures, but on their computer market expertise and their relations with other hardware vendors and software developers.

POWER FOR PCs

There is no questioning the PowerPC's power, both in processor performance and market clout. Due to the collaborative effort of IBM, Motorola and Apple, the PowerPC is an odds-on favorite to grab a significant chunk of the mainstream market. This is primarily because of PowerPC-based Macintoshes from Apple, and possibly clones from System 7 licensees.

In addition to System 7 and Workplace OS, the PowerPC has other OS options. For example, Sun Microsystems's software arm, SunSoft, says it is porting its popular Unix-based OS, Solaris, to the PowerPC platform. Sun has made some headway in the business computing market by targeting performance niches, and the performance of the PowerPC bolsters its appeal. Add to that activities with emerging object-oriented player Taligent and IBM's own Unix operating system, AIX, which already runs on the PowerPC.

Currently, but not for long, there is only one PowerPC chip from IBM and Motorola. The 601, which is now shipping, is a three-way superscalar chip that features a 32K byte cache. The 601 today comes with 60 MHz, 66 MHz and 80 MHz; a 100 MHz version is promised by year end. The 601 is the processor inside Apple's new Power Macs, which started shipping earlier this year.

Promised for this summer from both chip suppliers is the 603. Although it is tagged with a higher number, it is a lower-priced sibling to the 601. The 603, which comes with 16K bytes of cache, is designed for portables and low-cost desktop systems. Plans call for 66 MHz and 80 MHz versions. The PowerPC chip partners also plan to ship a higher-end processor by the end of the year. This chip, called the 604, includes 32K bytes of cache and starts at 100 MHz.

MIPS ALTERNATIVES

The MIPS camp, which has been pursuing the computing market far longer than the PowerPC troika, has an impressive array of processor options available from IDT, NEC and Toshiba. Suppliers are united in that they are pinning their fortunes in the PC market on the success of Windows NT, and they are banking on NT and the price/performance of their processors to catapult them into the server and power desktop markets.

All three MIPS suppliers are shipping flagship R4400 processors, as well as last-generation R4000s and even first-generation R3000s. The R4000 and R4400 come with different interfaces that are tailored for everything from high-end servers down to mass-market PCs. The flagship R4400 is the top performer of the 64-bit MIPS architecture, with speeds up to 150 MHz. Suppliers have hinted that the 200 MHz machine should be out this summer.

NEC is supplying the R4200 as a low-cost, low-power alternative for Windows NT systems. Because it funded this MIPS design, it has exclusive rights to the chip for a year, although it is unlikely that IDT or Toshiba will pick it up, as each have a low-cost option, the R4600, that they are now supplying.

THE ALPHA WAVE

Digital Equipment is focused primarily on Windows NT with its Alpha architecture. In fact, Digital has concentrated almost exclusively on the market for servers and high-end PC workstations. Toward that end, the company has amassed numerous CAD, database management, analysis and related power desktop applications that are now or soon will be native to Alpha.

On the hardware side, the company has been pushing Alpha as a high-end complement to the most current upscale x86 — Pentium — in computer makers' lines, and pledges to sustain its performance leadership over time. Today's 64-bit Alpha processor offerings include Digital's 21064, a two-way superscalar chip with a 16K byte cache, a 128-bit data bus and 150 MHz speed at the low end. The latest revision of the chip, called the 21064A, is arguably the reigning champ on the market in terms of raw speed. Digital now supplies the '064A in speeds up to 275 MHz, and the company says it can go higher.

In a low-end move similar to those made by NEC with the R4200, and Toshiba's and IDT's with the R4600, Digital announced a lower-cost Alpha chip called the 21066. The 166 MHz chip has only a 64-bit data bus, and also brings memory interface on board to cut Alpha system design costs. In addition, the 21066 is the first microprocessor to integrate the PCI local-bus interface on-chip. Mitsubishi, an Alpha licensee, is scheduled to sample its first implementation, called the M64, by year end.

WHERE SUN SHINES

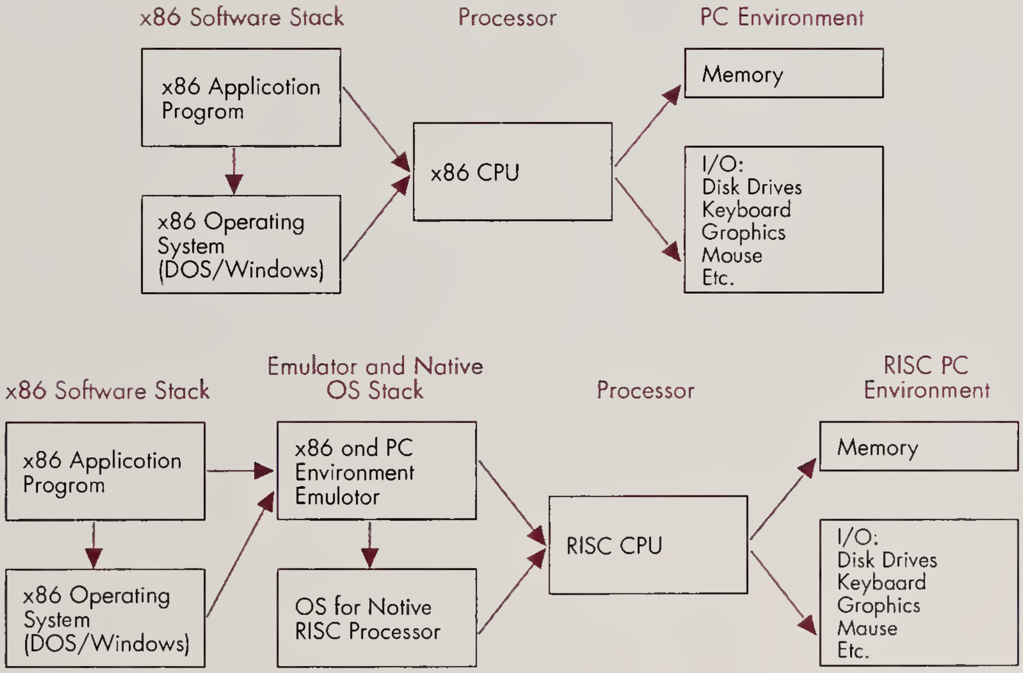
Sun, which has been a RISC computing leader, recently formed SPARC Technology Business, (STB) to market SPARC RISC processors and related components and assemblies. And while it is expected that Windows NT will one day run on the SPARC platform — workstation supplier Intergraph is porting NT to SPARC — the company meantime has made some inroads into the high-end workstation, client/server, networking and telco software development markets.

The main processor families available today from STB are microSPARC and SuperSPARC. The 32-bit microSPARC-II, an overhaul of the original microSPARC, is a highly integrated processor aimed at lower-cost systems. It has a 24K byte cache which is four times the size of microSPARC's, and is being made available in speeds up to 100 MHz, which makes it twice as fast as its predecessor.

The 40 MHz and 50 MHz Super-

FIGURE 3

Emulating X86 Instructions in the RISC PC Environment



Emulating an x86 environment on a RISC PC puts a drag on the RISC processor from two angles. First, it adds an extra layer of software that translates each x86 instruction into a series of instructions that the RISC processor understands. Second, the RISC processor needs to issue that series of instructions — not just one instruction, as an x86 processor would. Hardware emulation, which RISC processor vendors reportedly are considering, dramatically speeds the translation component of the process by building it right into the RISC chip.

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RISC Processors: Powerful, But Expensive To Integrate

RISC processors may be less expensive than comparable x86 chips, but PC vendors as yet are unable to turn that advantage into low-cost systems that compete on a dollar-for-dollar basis with mainstream x86 PCs.

In one sense, the comparison is biased. For instance, RISC suppliers are not primarily aiming for the low-cost mainstream, so it is not surprising that vendors cannot squeeze the chips into inexpensive systems. In fact, it is possible to make a case that a high-end RISC-based system costs less to build than a comparably configured Pentium computer.

Moreover, a large portion of the higher system cost is due to the fact that support components for the RISC processors such as system-logic chip sets and graphics components cost much more than x86 support chips simply because they ship in much lower volumes.

Nevertheless, the premium is significant: Mainstream x86 chip sets typically cost $15 to $25 apiece in volume, while RISC chip sets can cost four to six times that much. The premium would dissolve if RISC chips ever approach x86 volumes. And integrated processors, such as Digital's 21066, which includes a PCI and memory interface, eliminate the need for a chip set, and with it, the premium.

Although expensive, many of the RISC chip sets support standard PC expansion buses like ISA, EISA and, increasingly, PCI. But although that means modems, audio cards and other off-the-shelf PC peripherals should work out of the box, RISC PC designers have a significant BIOS effort ahead of them before they will get a graphics card, I/O card or any other bootable device to work inside the PC.

The reason is that bootable devices typically only ship with x86 BIOS code. However, RISC platforms do not ship in large enough volumes to nudge vendors of graphics chips and other peripheral chips with BIOSs to write boot code for them. As a result, PC makers need to spend what amounts to several dollars per system to get x86 bootable devices to run.

Another source of additional expenses: RISC vendors are working to supply x86 emulators for bootable devices with their processors. The first of these is Digital's Alpha processor, which comes with an x86 emulator that allows any Alpha system to use off-the-shelf graphics, I/O and LAN cards without modification. The MIPS camp is also reportedly preparing x86 emulators, and others are sure to follow.

But other inherent discrepancies will not go away. One of the most significant of these is the additional memory that RISC systems — at least those running NT — need beyond that of x86 systems. RISC suppliers privately refer to this as the "NT Tax." According to Microsoft, x86 PCs running Windows NT need 12M bytes, while RISC systems need 16M bytes. That means — using $30 per megabyte as a rough gauge — that a RISC system needs up to $120 more in RAM than an x86 PC.

With memory prices expected to be firm at least through the end of the year, the NT Tax can be severe. While some RISC suppliers acknowledge the differential, they dismiss it as inconsequential. According to them, no NT systems, be they built around Pentium, Alpha, MIPS or any other processor, ship with less than 16M bytes, and most ship with significantly more. So while the floor is admittedly lower, in practice there is no disadvantage.

In addition to offering more main memory, RISC processors usually run at faster speeds than x86 chips. Most x86s shipping today interface to memory at 33 MHz and, increasingly 60 MHz and 66 MHz. Most RISC processors, on the other hand, have bus speeds of 75 MHz. The faster speeds means that the system needs more expensive cache memory to support it. That typically adds at least $5 to the cost of the system.

Finally, most computer makers bundle the operating system and, increasingly, software applications with their PCs. Toward that end, PC makers says Windows NT costs about $10 more on average from Microsoft than the DOS-Windows bundle. Few popular applications are available for Windows NT at this point, so bundling applications is not even an option.

SPARC and SuperSPARC+ chips are aimed more at multiprocessing systems with speeds up to 60 MHz. SuperSPARC II chips, with speeds up to 100 MHz, are promised for this year, as are the 64-bit, 167 MHz UltraSPARC I processors.

HP's TARGET

With its PA-RISC architecture, HP has been focusing on what it calls the enterprise desktop: computers that play an integral role in a collaborative, distributed computing environment. The platform is designed for an environment that is intended to offer comprehensive multimedia support that will foster collaborative computing. Examples of this include imaging, shared whiteboard, audio messaging and related applications.

With this environment in mind, the company built multimedia capabilities into its newest PA-RISC processor, the PA-7100LC. Using the two-way superscalar chip, PC vendors can build multimedia computers with basic MPEG video decoding without adding expensive, special-purpose hardware. The chip, which comes in speeds up to 80 MHz, is also highly integrated, which keeps both PC manufacturing costs and computer prices down.

The highly integrated nature of the chip bore fruit earlier this year when HP's systems arm unveiled five new computers based on the PA-7100LC that shattered existing price-performance standards in the workstation arena. The least expensive of the five starts at under $4,000.

FUTURE PROSPECTS

All of the RISC suppliers are making headway in the server market, as well as in specialized computing segments. This is due primarily to the blazing speed for which they are known, and because the markets in which they succeed are much less concerned about x86 compatibility than they are about wresting every cycle of performance that they can out of their computers.

IBM and Motorola should outship all of the other RISC processor suppliers combined, once Apple makes good on its decision to base the next generation of Macintoshes on the PowerPC architecture. Ironically, however, the success of the architecture relies not so much on Apple's hardware business as it does the software side of the house: If Apple does not license its operating system, the PowerPC is left without a sure vehicle for riding into the x86 domain.

As for the other RISC suppliers, each is leveraging inherent advantages in its architecture, company infrastructure and relationships in the hardware and software communities to carve out markets for specialized computing in areas such as CAD, distributed computing and multimedia authoring.

For the long term, these RISC suppliers are hoping that their superior performance and growing markets will spawn new features and applications. They are also hoping that their markets will move further into the general-purpose, mainstream market.

In the x86 arena, Intel likely will spend the next six months gearing up for what should prove to be the biggest onslaught of competition it has ever faced. Just 18 months after it started shipping Pentium, Intel will find itself fending off four competitors to its fifth-generation chips — provided those competitors deliver as promised.

Interestingly, IBM will be manufacturing chips for three of the four competitors: Cyrix, NexGen and itself. As part of its agreement with Cyrix, IBM will be reselling Cyrix chips under its own name. The fourth Pentium-class competitor is promised by AMD, which will manufacture it. For buyers, all of this competition can only mean that the pace of new technology, which has grown fast and furious during the past year, is going to quicken. Happily for these buyers, along with the endless parade of new processors will also come more of the dramatic price declines that characterized the past year. ■

For buyers, all of this competition can only mean that the pace of new technology, which has grown fast and furious during the past year, is going to quicken.

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CIO for hire

CONTINUED FROM PAGE 83

Sometimes they are in transition, looking to tide themselves over or perhaps attempting to change to a permanent job through a temporary assignment. Or these CIOs may feel there is a need for this type of peripatetic work and are making a career following opportunities from company to company.

Assignments generally last nine months to a year, although this varies widely. Salaries are prorated, based on what the CIO's annual salary would be. CIOs for hire may also be given a bonus at the end of the contract time. There are usually limited or no benefits.

Gathering no moss

However, some, like Feld, accept a tradeoff in benefits and job security for the chance to move around, face new challenges and keep from getting stale sitting at the same desk year in and year out.

They may also appreciate the liberation from office politics and the ability to focus on the substance of their work — just go in, perform the task, then move on. It takes a certain type of person to move in and out of several situations in just a few years.

"You have to be a people person, not a classic engineer — an introvert who wants to sit in a room. You must be able to communicate well from the beginning to get staff support behind you. You have to be a risk taker and sophisticated at the same time. There are real business reasons for your being there every day," Thompson says.

"You have to be right on the cutting edge of whatever core skills are required. That's the only way to distinguish yourself from those around you. You've got to hit the ground running and have a short learning curve. You don't have six months to settle in and figure the systems out," he adds.

Client companies have many reasons for choosing an interim CIO. One may be needed to open a large branch office or a new wing of the business, says Barbara Steinem, president of Dahl-Morrow International, an executive management firm in Reston, Va. "Some companies have had a bad experience with their technology servers in the past, and this enables them to 'try before they buy.' By hiring an interim CIO, the company can control its bottom line, and it doesn't have to commit long-term," she says.

Or, if a company is redoing whole systems, "they bring in someone for the transition. This takes pressure off current people, and the CIO can train permanent staff," Thompson says.

"Today, companies have a wide variety of needs that warrant a spectrum of solutions. What I do is a kind of custom-crafting 'boutique' approach to the profession. It's not so much methodology that they're looking for but experience, personality, reputation," Feld says.

A company "can bring in an expert like me to work through the hard spots," he says. "Once they've done that, the IS organization has credibility, internally and externally, and I can even help them find my replacement. It's then a lot easier to come in and be the second CIO."

For Feld, becoming a temporary CIO was a way to rekindle the sense of excitement he enjoyed earlier in his career.

Feld says that despite his successful long-term career at Frito-Lay, "the first couple of years were the ones which intrigued me. They were the significant ones in terms of the organization."

A job can lose its appeal at "companies that haven't done any significant IS development in years," Feld says. That was why he decided to explore new opportunities.

"The organization needs someone special when you're starting from scratch with an entirely new or revamped system. I thought I would work for a company, put together the system, get it to the point where we could find my replacement, then move on. My goal was to work at five or six different places in the next 10 years, instead of just one."

Staff questions

It may be fun to jump in and out of challenging situations, but what about the IS staff?

"The whole IS staff feels a lack of commitment to the company from the information technology organization because you have a temporary leader," Koeller says. "If you are there telling the whole staff, 'We'll bring in Harry Brown for two years,' you know two years from now something is going to change."

The result can be "double or triple the cultural problems you have as a new CIO in the first place," Koeller says. "If you go in as a new CIO, as I've done twice, you have to find out the concerns of your staff and deal with those. Some cultural issues take two, three, four years to work through and are impossible for a rent-a-CIO to make progress on."

Even recruiters agree that not every situation is a match made in heaven. Problems do arise.

"There can be a change in the company's direction, and the interim CIO's particular skills may not be best suited to the new situation," Thompson says.

"CIOs may find that the company's heart isn't in the project, and they're not getting the support they need in the job they were hired to do," Steinem says.

And of course, sometimes relationships just don't gel.

To avoid bad matches, Thompson advises clearly defining the assignment and what is expected of both parties. Include a lot of feedback loops with plenty of benchmarks along the way to measure success. And if there is a change in requirements, it is best to be honest and move on to different personnel.

Although there are no hard statistics on how many people work as interim CIOs, those who do are pioneers.

"You have to prove yourself all over again. You have to be willing to continuously put yourself and your reputation on the line. Your financial security and your ego is on the line. I could fail here or at the next assignment," Feld says.

"But if you can get focused, people will want to build stuff; people will want to do great things," Feld says. "It's a tremendous opportunity for learning and growing." ■

Menagh is a free-lance writer in New York.

TEMPORARY EXECUTIVES: IS BUSINESS BOOMING?

CIOs are not the only executives who are hiring themselves out on a temporary basis. Former chief executive officers, chief financial officers and other senior executives are also joining the temporary ranks.

The trend has spawned a new industry: agencies that place temporary executives. There are now more than 200 such firms, compared with just 40 in 1990, according to David Lord, editor of "Executive Recruiter News," a newsletter in Fitzwilliam, N.H.

Temporary CIOs are "a relatively small part of the career market. It may never be huge, but we think it will get bigger. Clearly there is a need for project-oriented or interim professional or executive people," Lord says.

But CIOs interested in a career as a temporary executive shouldn't depend too much on these agencies.

"One thing we are careful to let people know is that when they send their resume to one of the firms that place temporary IS people, it's likely they are joining a database of several thousand people. The agency itself may place no more than five or 10 people a year — it can be that small. So it's not like you can expect to get a call next week. In fact, the odds of ever getting a call are slim. But they do exist," Lord says.

CRITICAL QUALITIES

CIOs shouldn't go the free-lance route unless they can put a check next to each of these items:

- ✓ **Proven track record.**
- ✓ **Ability to focus on tasks.**
- ✓ **Non-political approach.**
- ✓ **Energy and enthusiasm.**
- ✓ **Belief in yourself.**

Source: Charles Feld, CIO for hire

TERMS FOR TEMPS

Contracts for temporary CIOs usually reflect the following terms:

Assignment length:
9 months – 1 year.

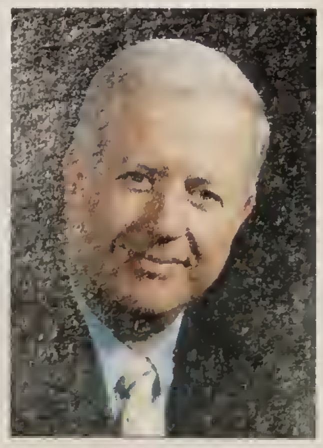
Salary:
Prorated, based on a year's stay.

Bonuses:
Often given at end of the contract.

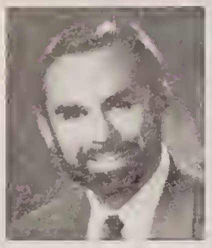
Benefits:
Usually limited or none.

"Why someone would want to rent a CIO is that they need immediate help, there's no one inside, and they can't, in their opinion, wait to hire somebody. If they are going to go this route, they should be making the judgment long-term that they don't want a CIO. Then, rent a CIO makes sense."

— Richard Koeller, president of Koeller & Associates, Chicago, and former Whirlpool IS chief



Executive Track



Alain Pinel Realtors in Los Gatos, Calif., has announced the appointment of **Mark Richards** as chief information officer. His responsibilities include directing all technology efforts such as software development, training and strategic direction. Prior to coming on board at Alain Pinel, Richards was president of Affinity Software in Palo Alto, Calif.

Human Genome Sciences in Rockville, Md., has announced the appointment of **Michael Fannon** as director of bioinformatics. In this new position, he will be responsible for the overall design and implementation of computer-assisted analysis of DNA sequencing efforts and will have overall responsibility for information services.

Fannon has 15 years of experience in the management and development of advanced information management and data communications systems. He was previously president of TSI Consulting, Inc. Prior to founding TSI, he held a series of technical and management positions at Martin Marietta's Information Systems Group in Orlando, Fla., and Bethesda, Md.

Avalon Software in Tucson, Ariz., has announced the appointment of **Timothy F. Ryan**, 36, as CIO. Prior to the appointment, Ryan was director of information technology at Vanguard Automation, Inc. He was previously consulting services manager at Consilium's Flowstream Group and information services manager at National Semiconductor Corp.

Norstan, Inc. in Maple Grove, Minn., has announced the appointment of **Mary Lynne Perushek** as vice president of information services. She was previously director of MIS at the company. Perushek will manage an information systems staff of 50 and will be responsible for 50 offices in 18 states and Canada.

Principal Financial Group in Des Moines, Iowa, has announced that **Thomas J. Graf**, 46, senior vice president responsible for the information services business unit, will take over the group insurance business unit Aug. 1. **Michael H. Gersie**, 45, vice president of the new business development unit, has been named senior vice president to succeed Graf.

McGraw-Hill, Inc. in New York has announced the appointment of **John D. Kerin**, 55, as senior vice president of information management, a position that has been vacant since January. Kerin will be responsible for developing a corporate position on the information services, resources and investments to be provided for electronically-based products and services and for the development of an information policy program for the corporation.

He previously served as senior vice president of technology at the financial information services group and has held a variety of other positions at the company since joining it in 1979 as senior director of application systems development.

Fractal Design Corp. in Aptos, Calif., has announced the appointment of **Dan DiPaola** as director of entertainment technologies. In this newly created position, DiPaola will head the Entertainment Technology Center, a hands-on research and development facility for the film and television industries in Burbank, Calif. He will also track future entertainment technology opportunities.

Prior to the appointment, DiPaola worked at Walt Disney Studios, Inc., where he created the Desktop Graphics Lab for Walt Disney Pictures and Television.

Korn/Ferry International in Century City, Calif., has announced the appointment of **David King** as CIO. Prior to joining Korn/Ferry, he was CIO at Sun America, also in Century City.

Bell Atlantic Corp. in Philadelphia has announced the appointment of **Steve Shapiro** as director of IS. His responsibilities will include structuring alliances with cable systems owners and telephone companies for Bell Atlantic's multimedia products and services. He will also work with foreign telecommunications authorities on behalf of Bell Atlantic.

The Chase Manhattan Bank NA in New York has announced the appointment of **Tom DeCanio** as vice president of network planning.

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Intelligence Files

Chairman's survival tips

Everyone knows the drill: Chief executive officers want information systems chiefs who know the business cold, deliver systems on time and on budget and talk in plain English. But what else goes into the fine art of pleasing the boss?

Thomas E. Epley, chairman and CEO at Technicolor, Inc. in North Hollywood, Calif., advised 200 southern California IS managers how to be perceived positively at the University of California at Los Angeles Information Systems Associates' annual conference. His tips include the following:

- Solve problems; do not create problems or dissonance in the organization. "Don't ever put the CEO in a position of constantly defending the IS function."
- Set a cost-cutting example for the line organization. "Other organizations are cutting back. You have to show you are as concerned with efficiencies and costs as others."
- Forget about being a technical empire builder. "It scares people to think someone is creating a technical empire that they don't understand."
- Understand the business, but "you clearly need to be current on technology. No one else is going to do that stuff."
- Don't get sidetracked searching for technical elegance. "We've created all kinds of solutions that were elegant but are now gathering dust. Creating a solution more elegant than required for that application will undermine your IS organization." Build "the most effective solution," not the one "of greatest interest for discussion at a technical forum."
- Take initiative; don't be reactive. "Know the organization [and technological opportunities] well enough to say, 'Hey! We can do this.' "
- And remember, "The only reason for your existence is to enhance the profitability of the organization."

Bournes fits Kodak image

Two weeks after announcing it will sell off three business units in the health care area, Eastman Kodak Co. in Rochester, N.Y., has completed an executive restructuring, naming Richard T. Bournes executive vice president of the Kodak Imaging Group.

Bournes will oversee Kodak's digital imaging and equipment businesses. Leo J. (Jack) Thomas will continue as the imaging group's president, with responsibility for traditional imaging businesses, including consumer photo-finishing. Both will report to George M. C. Fisher, who has spent much of his first five months as CEO refocusing Kodak's resources around its core imaging business.

Under the new corporate structure, John Chiazza, Kodak's acting director of IS and business processes, will continue to report to Thomas.

Citicorp group on the move

Citicorp has announced that it has subleased 115,000 square feet of office space from IBM in Westlake, Texas, which the bank holding company will use to house its Global Finance Technology Division. The unit provides technology support to the bank's commercial and investment banking businesses.

As part of its efforts, Citicorp plans to recruit up to 150 new employees at the facility by year's end. Citicorp's presence in the Lone Star state includes a service center for its U.S. branch banking system in San Antonio, a credit card collection facility in Richardson, corporate banking and cash management offices in Dallas and a corporate banking office in Houston.

Palmer to receive IS award

Jonathan J. Palmer, the top IS executive at Barnett Banks, Inc. in Jacksonville, Fla., will receive the Lattanze Center's IS executive of the year award on June 9. As CEO of the bank's IS unit, Barnett Technologies, Inc., Palmer was cited for implementing advanced systems to improve customer service. The Lattanze Center is an IS research institute based at Loyola College in Baltimore.

Even the best can be slow

Even the best corporate IS departments can be slow to adopt best practices, according to a new study by Gateway Management Consulting in New York.

The study polled 200 companies selected from *Computerworld* and *Information Week* rankings of the best corporate IS users and found that most were not implementing the best practices and controls generally accepted by the industry. Only in the areas most often audited by parties outside the IS organization — security and disaster recovery — was compliance to formal practices generally found, the survey said.

Among the findings: 52% do not have formal service agreements with clients, 38% do not have a formal program of quality assurance, 31% do not have a formal program of education and training, 27% do not have formal published IS policies, and 27% do not have a standards manual.

"We wanted to determine definitively what IS managers felt," says Gateway Executive Vice President Mark Klein. And "clearly . . . a significant number of IS organizations do not use practices and controls considered to be effective."

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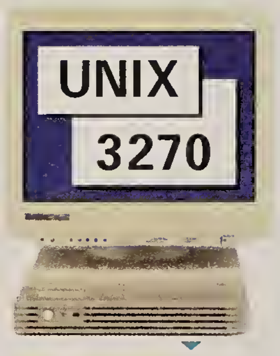

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Calendar

JUNE 19-25

Object-oriented Programming Using C++. Ann Arbor, Mich., June 20-21 — Lecture and hands-on programming course featuring the basic ideas of object-oriented design and programming using C++. Contact: University of Michigan, Ann Arbor, Mich. (313) 764-8490.

A/E/C/ Systems '94. Washington, June 20-23 — Topics include: Using technology to meet federal requirements, and the computer-effective project manager. Contact: Sharon Price, A/E/C/ Systems '94, Newington, Conn. (203) 665-0153.

Computer Tools and Client Demands Conference. Washington, June 22 — Theme: New Methods for Architectural Practice. Topics include: How should the process of delivering architectural services change in the face of new technologies and how are client needs driving changes in service delivery technologies? Contact: The American Institute of Architects, Washington, D.C. (202) 626-7300.

CrossTarget User Group Meeting. Burlington, Mass., June 22-23 — Contact: Amy Schenk, Dimensional Insight, Burlington, Mass. (617) 229-9111.

Re-engineering the Order-to-Delivery Cycle. Chicago, June 22-23 — Contact: International Quality & Productivity Center, Upper Montclair, N.J. (201) 783-4403.

Object-oriented Analysis, Design and Databases. Ann Arbor, Mich., June 22-24 — An overview of the variety of engineering, scientific and business applications where the object-oriented approach is superior to the classical relational approach. Contact: University of Michigan, Ann Arbor, Mich. (313) 764-8490.

Re-engineering: The Implementation Perspective. Cambridge, Mass., June 22-24 — Michael Hammer from the Center for Re-engineering Leadership will provide an introduction to the concepts and objectives of re-engineering with an analysis of the business factors driving it. Contact: Hammer and Co., Cambridge, Mass. (617) 354-5555.

1994 International Summer Consumer Electronics Show. Chicago, June 23-25 — Contact: Electronic Industries Association, Washington, D.C. (202) 457-8700.

CreaTech & InterAd. New York, June 23-25 — Conference will focus on advertising and marketing that use multimedia technology. Contact: Cynthia Upson, Electronic Industries Association, Washington, D.C. (202) 457-8728.

JUNE 26 - JULY 2

CAUSE Management Institute. Boulder, Colo., June 26-30 — Professional development program for managers of information technology in higher education. Contact: CAUSE, Boulder, Colo. (303) 449-4430.

Database & Client/Server World. Boston, June 28-30 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

PC Expo. New York, June 28-30 — Contact Bruno Blenheim, Inc., Fort Lee, N.J. (201) 346-1400.

Project Leadership Conference. Chicago, June 28-30 — Theme: Making good project managers into great leaders. Contact: Sophia Zouras, Applied Business Technology, New York, N.Y. (212) 219-8945.

RM25: The Relational DBMS Silver Anniversary Conference. Boston, June 28-30 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

JULY 3-9

Enhancements to Mature Chargeback & IS Financial Reporting Systems. Scottsdale, Ariz., July 6-8 — The seminar will focus on information systems chargeback and financial effectiveness and efficiency. Contact: Financial Management for Data Processing, San Francisco, Calif. (415) 731-3706.

Technomics '94. Orlando, Fla., July 6-8 — Topics: Sources of lease financing; impact of specialization, diversification and captives; strategies and tactics as the industry matures; impact of leasing on corporate financial ratios. Contact: International Computer Negotiations, Inc., Winter Park, Fla. (407) 740-0700.

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COMPUTERWORLD
Unix net helps Fedex say "no problem"
Bank touts revamp as customer draw
Microsoft lays out tiered DBMS plan

The Newspaper of IS

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You'll also learn how the best minds in your organization will be able to form "virtual teams"—no matter where they are—to work simultaneously on the same project, and streamline the business decision-making process.

James Champy, Chairman, CSC Index, Inc., and co-author of "Reengineering the Corporation," will provide insight on using information technology as an essential enabler in the reengineering process.

If you want to make your business and technology operations more competitive today and in the future, you need to attend the Microsoft Information Exchange Conference. Don't miss this milestone event. Make your reservation now.

Information Exchange Conference Highlights, June 20-23

- Technical sessions and panel discussions led by Microsoft and industry experts covering more than 50 topics including: Microsoft Mail, information exchange, gateway connectivity, network support, development, and workgroup application integration and live information exchange demonstrations.
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Information Exchange Event, June 21, 9:00am-1:00pm

(This is a free technology preview.)

- William H. Gates gives you a sneak preview of Microsoft's forthcoming information exchange technologies as he discusses his vision of how they improve business productivity.
- James Champy provides analysis on how companies can successfully reengineer business processes using information technology.
- Case studies featuring challenges faced by multinational Fortune 500 corporations and how they plan to reap benefits from information exchange.

Registration fee: $895. You are not considered registered and a space cannot be held for you until payment is received. Cancellations made by June 3, 1994 will be accepted subject to a $100 cancellation fee. Cancellations made after June 3, 1994, as well as no-shows are liable for the full registration fee. Cancellations must be made in writing. Space is limited.

To witness the Microsoft Information Exchange Conference June 20-23, 1994, in Seattle, call (800) 421-2499, Dept. MSU5E, 6:00am-6:00pm PST. Space is limited.

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When you register please let us know two weeks before the conference if you have any needs that require special attention such as wheelchair, dietary restrictions, or vision or hearing impairment. We will make every effort to accommodate you.

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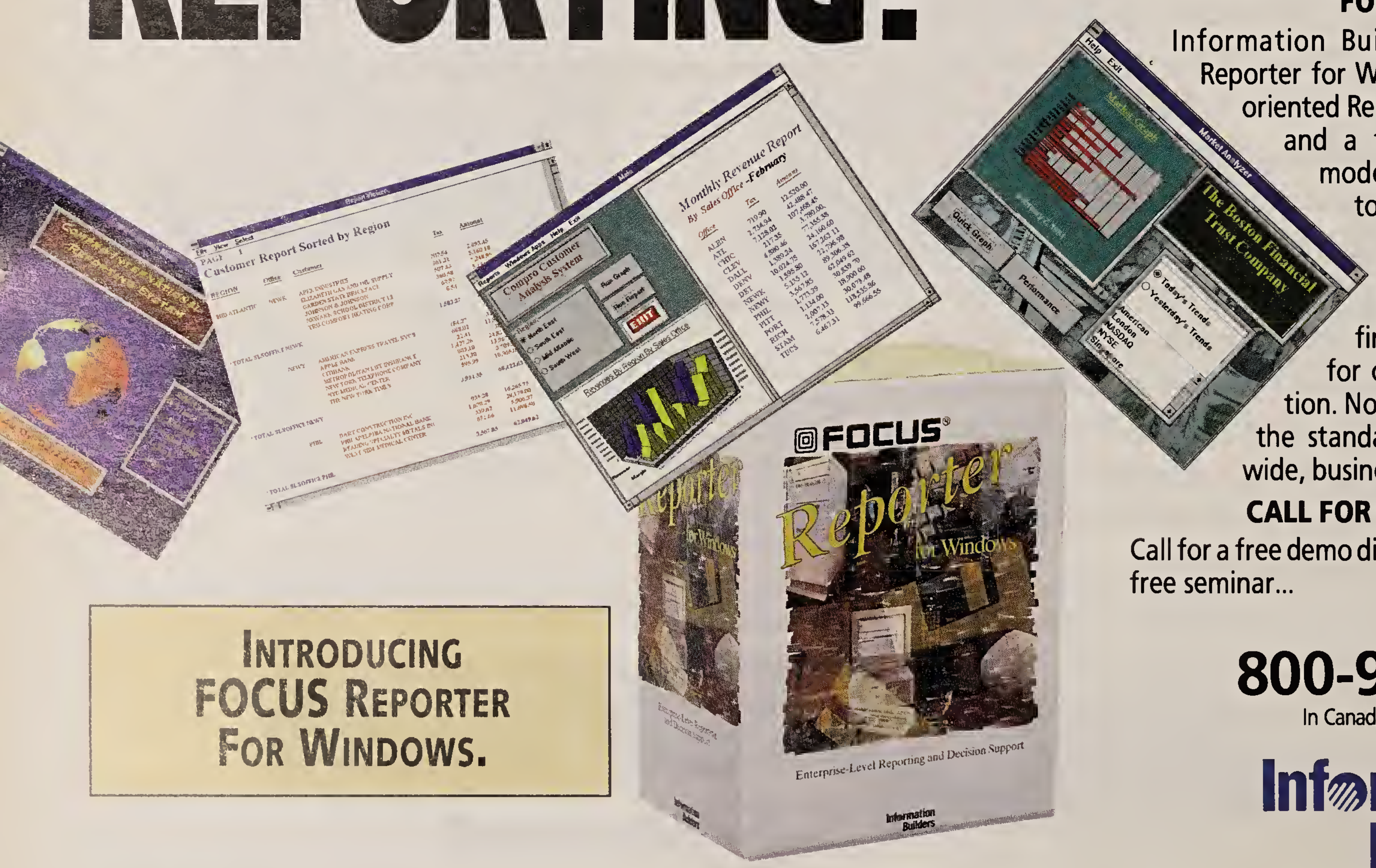
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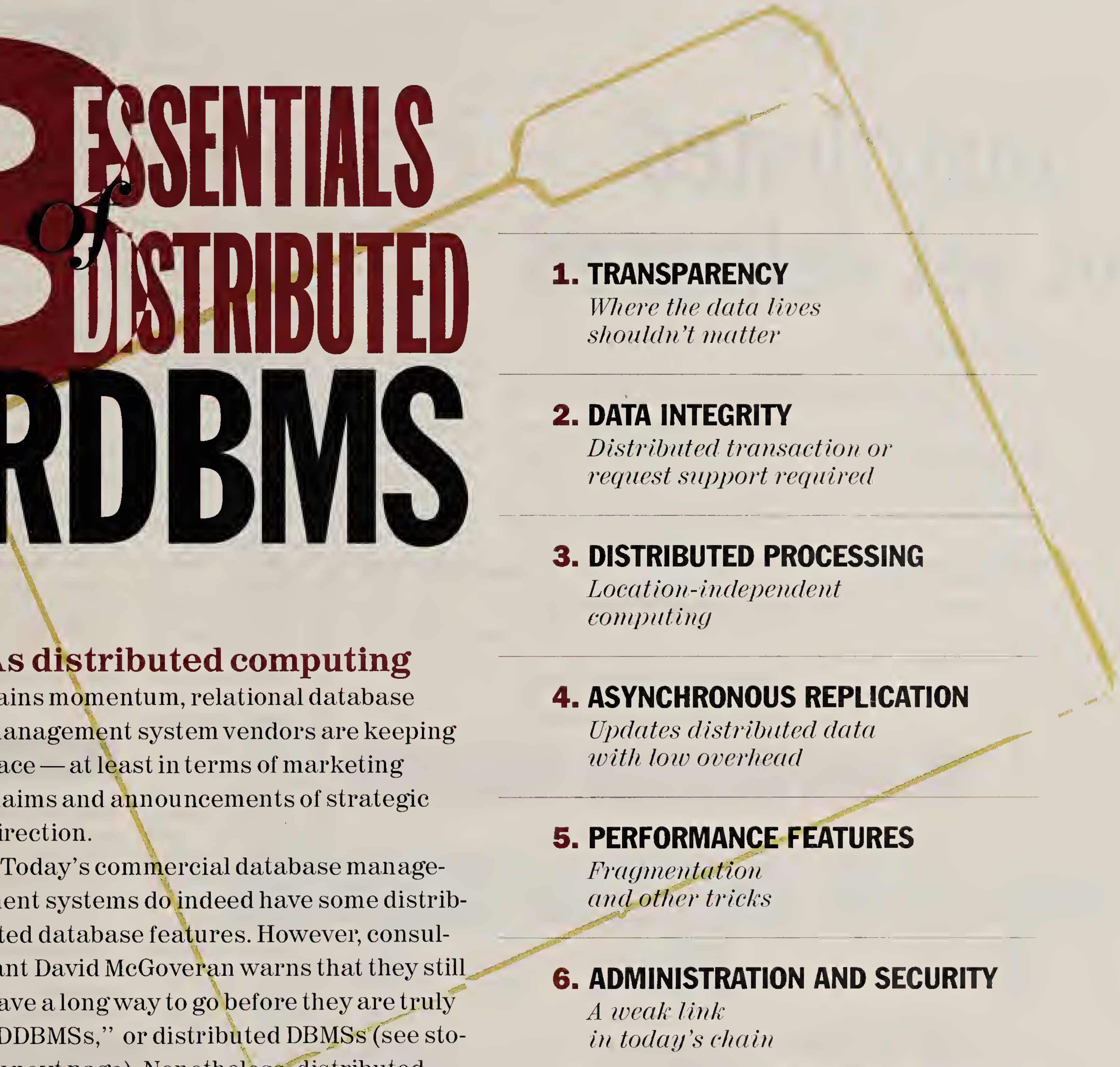
8 ESSENTIALS *of* DISTRIBUTED RDBMS



As distributed computing gains momentum, relational database management system vendors are keeping pace — at least in terms of marketing claims and announcements of strategic direction.

Today's commercial database management systems do indeed have some distributed database features. However, consultant David McGoveran warns that they still have a long way to go before they are truly "DDBMSs," or distributed DBMSs (see story next page). Nonetheless, distributed database features are useful and becoming more robust. McGoveran walks through eight key areas for distributed databases and how leading vendors plan to meet the technical challenges. In some cases, he notes, support for a single feature can be the difference between the success or failure of a particular application.

Also in this section, the Buyers' Satisfaction Scorecard examines four leading distributed RDBMS candidates through the eyes of their users. And Firing Line looks at mainframe DBMS vendor Cincom and its move to distributed computing with Supra Server.

1. TRANSPARENCY
Where the data lives shouldn't matter

2. DATA INTEGRITY
Distributed transaction or request support required

3. DISTRIBUTED PROCESSING
Location-independent computing

4. ASYNCHRONOUS REPLICATION
Updates distributed data with low overhead

5. PERFORMANCE FEATURES
Fragmentation and other tricks

6. ADMINISTRATION AND SECURITY
A weak link in today's chain

7. AVAILABILITY AND AUTONOMY
Local autonomy keeps the database up and running

8. INTEROPERABILITY
Public standards, private standards and gateways

▶ **BUYERS' SATISFACTION SCORECARD**
Oracle 7 tops the charts. Page 113

▶ **FIRING LINE**
Users kick the tires on Cincom's Supra Server 2.x. Page 117

8 ESSENTIALS of DISTRIBUTED RDBMS

Distributed not yet delivered

But there are some gains evident in current vendor approaches

BY DAVID McGOVERAN

Database management systems, like many technologies at the core of information systems operations, are undergoing a sea change. Organizations are attempting to adapt rapidly to successive waves of client/server computing, re-engineering and user data-access demands.

IS managers are under the gun to place the databases containing vital company information closer to users. The goal is to increase response time and simplify access for those who need the data most.

The dilemma is that data management, which includes guaranteeing data security and integrity, is most easily done at a central location where IS can provide standard procedures and methods for getting the job done consistently.

Unfortunately, the waves are irresistible, and IS organizations and DBMS vendors are beginning to use advanced concepts and technologies, known as distributed DBMS, to meet user needs.

Ideally, a distributed DBMS should appear to the user as a single, nondistributed system — even though it is physically located at different sites. Accomplishing this with today's products is a data management and system design nightmare.

Although today's DBMS products are still far from achieving the goal of a truly distributed DBMS, many of the new features they offer can reduce the number of sleepless nights for data managers and IS executives.

One compromise between IS' need to manage distributed DBMSs and the requirement that they be placed in multiple locations is a concept called asynchronous replication. It requires that a change made in one database be relayed to a second database in a certain amount of time set by the data administrator. This allows the data to be updated in a time frame that conforms to IS capabilities.

TALE OF THE TAPE

Two approaches to distributed databases

METHODS	TWO-PHASE COMMIT	ASYNCHRONOUS REPLICATION
CHARACTERISTICS	Peer-to-peer servers	Master/Slave servers
	Real-time updates	Near-real-time updates
	Synchronous updates	Asynchronous updates
	New transactions blocked during update	Continuous server operation
BOTTOM LINE	IS has limited control over updates	Lets IS control timing and network traffic

Source: International Data Corp.

Asynchronous replication is flawed because it does not provide real-time updating such as that enforced by the more rigorous, but more resource-intensive, two-phase commit.

Despite its flaws, replication is becoming the predominant distributed DBMS strategy for many organizations and vendors.

Apart from this major trend, vendors are offering different approaches to the key requirements of distributed DBMS. The following are eight areas that need to be addressed to accomplish a truly distributed DBMS.

Knowing how the vendors address them and how important each area is to you and your users is the key to selecting the right DBMS.

1. TRANSPARENCY

The ability to locate data in different databases on servers closer to users is central to relational DBMSs and doubly important for distributed databases. The location of the data, its physical storage format and the methods used to access the data (for example, which index to use) should be invisible to the user.

Today's DBMSs do not even come close to providing distributed transparency. The vendors use different dialects of SQL, the key data-access language for today's relational DBMSs. These dialects mix the **logical constructs** of the DBMS, such as how a table is defined and managed, and the **physical construct**, which defines how the data is stored. This mixture of definitions is an unfortunate and disabling violation of the relational model. The result is that access to and management of distributed data is more complicated.

Worse, failure to provide transparency precludes taking advantage of additional physical resources without modifying application code.

Most of today's products do not support an important element of transparency: the distributed system catalog. Without it, developers must embed in their applications references to table locations or, at the very least, must explicitly open connections to servers involved in a distributed transaction, such as Digital Equipment Corp.'s Rdb/VMS.

Exceptions to this generally involve the creation of synonyms for distributed tables (Oracle Corp.'s Oracle 7) or connection to a special server (The ASK Group, Inc.'s OpenIngres).

2. DATA INTEGRITY

Enforcing data integrity in a distributed environment requires support for a distributed transaction or distributed request. This capability allows a transaction consisting of multiple SQL requests to be processed at multiple locations, locally or remotely.

This requirement is obvious if integrity constraints involve distributed objects. If a local table is updated, but there is a referential integrity constraint involving remote tables, an implicit distributed transaction is clearly required. Products such as Informix Corp.'s Informix-OnLine, Oracle 7 and OpenIngres/Star place restrictions on how integrity constraints can be expressed, effectively providing no support for distributed integrity constraints.

3. DISTRIBUTED PROCESSING

Few DBMSs support arbitrary multisite read, multisite write and multisite read/multisite write transactions. However, a true distributed DBMS must support not only **remote request**, **remote transaction** and **distributed transaction** but also **distributed request** because anything less implies location dependence.

This type of request allows tables from multiple locations to be accessed using a relational join or union operation. Both distributed transaction and distributed request require support for the infamous two-phase commit or its equivalent; otherwise, global database consistency cannot be enforced in a distributed environment.

At this point, products such as Cincom Systems, Inc.'s Supra Server (see Firing Line, page 117), Informix-OnLine, Oracle 7 and OpenIngres/Star provide some support for remote request, remote transactions, distributed transactions and distributed request, while products such as Sybase, Inc.'s System 10 support only remote request and remote transaction.

4. ASYNCHRONOUS REPLICATION

In the last two years, so-called asynchronous replication has become increasingly important. Asynchronous replication provides the ability to propagate updates without the overhead of two-phase commit.

This involves two assumptions. First, the updates need not be propagated immediately, so all copies need not be simultaneously consistent. Second, the nature of the application is such that any violations of global database consistency will not be known immediately.

The validity of these assumptions can be extremely difficult to prove and depend on subtle details such as transaction mix, database design and application functionality. This feature cannot replace the need for distributed transaction and distributed request, although sometimes it reduces their inappropriate use.

Products suites such as Oracle 7, System 10, Informix-OnLine and OpenIngres offer replication capabilities, but these differ in many ways. Most apparent is the mixture of data sources and targets permitted and the granularity of the replications such as table, view and database.

For example, only OpenIngres Replicator was designed for peer-to-peer as well as master/slave configurations, a capability to be added to Oracle in Version 7.1.

Informix-OnLine supports full database replication, whereas Oracle 7, OpenIngres and System 10 support

RDBMS, *page 114*

Oracle rides reliability to the top

RDBMS vendor outscores rivals in security and integrity

COMPUTERWORLD BUYERS' SATISFACTION SCORECARD

By Derek Slater

"Open" relational database vendors are playing a high-stakes game of leapfrog, adding loads of features to each new release. In fact, the upgrades are coming out so quickly, you can't tell the players without a Buyers' Scorecard.

Oracle Corp.'s namesake relational database management system topped *Computerworld*'s user satisfaction poll with an overall rating of 72, ahead of cutthroat rivals Sybase, Inc.'s Sybase and Informix Corp.'s Informix-OnLine. The ASK Group, Inc.'s Ingres DBMS, soon to be acquired by Computer Associates International, Inc., finished fourth.

Key to Oracle's success was its lead in overall reliability, according to ratings from its installed user base. Reliability categories, including data integrity, backup and recovery functions and data security features, were users' No. 1 concern in evaluating RDBMSs, and Oracle's respondents gave the product a comfortable margin in each of those crucial areas.

Oracle also outscored competitors, notably in operation in a heterogeneous environment and support for complex tables. Oracle's weakness was in the area of technical service and support, where it tied for lowest user satisfaction.

Sybase's System 10 includes several notable improvements, including Control Servers for better backup and recovery and database tuning. Sybase's Replication Server is also a new addition to the product line. In the survey, Sybase stood out in ease of installation in client/server environments but lagged behind in quality of application development tools. Sybase's new Gain Momentum product is one effort to improve that.

Informix distinguished itself in technical support and documentation. It also earned the best satisfaction ratings in on-line transaction processing (OLTP) performance, probably because of Informix 6.0's multithreaded architecture, which lets the DBMS take advantage of multiple processor servers. However, Informix had the lowest score in performance in decision-support applications.

Ingres did not take the top score in any area, but it finished second in the important area of security features. Users also indicated that Ingres' application development tools are roughly on par with its competitors' tools. Ingres' overall score was particularly hurt by low scores in value for the dollar and cost of acquisition and maintenance. Ingres 6.4 is being replaced by OpenIngres, released too recently to make up the bulk of the respondents. OpenIngres adds object-oriented functionality and replication capabilities.

The chart at right shows the relative weight users place on each evaluation area. At this comparatively early stage of distributed computing, users said they are far more concerned with reliability and data integrity features than with performance issues.

Ratings in the charts below comprised several areas: OLTP performance, decision-support performance and support for complex tables. Users also rated products' interoperability, which comprised three subcategories: standards support, operation in a homogeneous distributed environment and operation in a heterogeneous distributed environment. ■

Slater is an assistant editor.

IMPORTANCE RATINGS

AREAS MOST CRITICAL TO USERS

8.8 RELIABILITY
- DATA INTEGRITY
- BACKUP AND RESTORE FEATURES
- SECURITY

8.2 VENDOR SUPPORT
- DOCUMENTATION
- VENDOR SERVICE AND SUPPORT

7.9 COST
- VALUE FOR THE DOLLAR
- ACQUISITION/MAINTENANCE COST

7.7 EASE OF USE
- EASE OF QUERYING
- EASE OF PROGRAMMING
- APPLICATION DEVELOPMENT TOOLS
- EASE OF INSTALLATION
- END-USER TOOLS

IMPORTANCE RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS THE MOST IMPORTANT

ORACLE CORP.
ORACLE

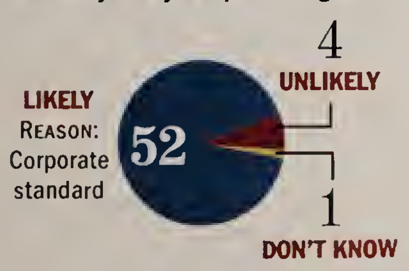
TOTAL SCORE **72**

RESPONSE BASE: 57 USERS

7.9	RELIABILITY
6.7	SUPPORT
6.8	COST
7.0	EASE OF USE
7.2	INTEROPERABILITY
7.0	PERFORMANCE

RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS BEST.

Would you buy this product again?



REASON GIVEN IS THE MOST FREQUENTLY STATED ANSWER

INFORMIX CORP.
INFORMIX-ONLINE

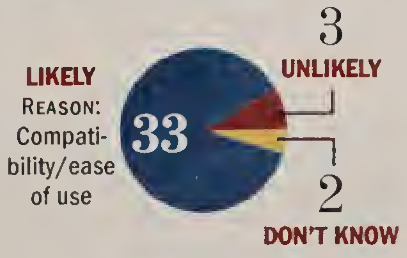
TOTAL SCORE **69**

RESPONSE BASE: 38 USERS

7.3	RELIABILITY
7.1	SUPPORT
6.7	COST
6.8	EASE OF USE
6.8	INTEROPERABILITY
6.5	PERFORMANCE

RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS BEST.

Would you buy this product again?



REASON GIVEN IS THE MOST FREQUENTLY STATED ANSWER

SYBASE, INC.
SYBASE

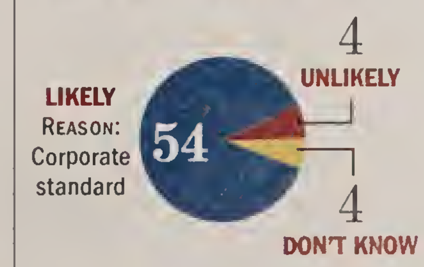
TOTAL SCORE **69**

RESPONSE BASE: 62 USERS

7.3	RELIABILITY
6.8	SUPPORT
6.5	COST
6.7	EASE OF USE
7.0	INTEROPERABILITY
6.6	PERFORMANCE

RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS BEST.

Would you buy this product again?



REASON GIVEN IS THE MOST FREQUENTLY STATED ANSWER

THE ASK GROUP, INC.
INGRES

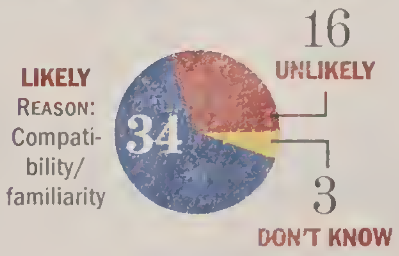
TOTAL SCORE **67**

RESPONSE BASE: 53 USERS

7.2	RELIABILITY
6.6	SUPPORT
5.9	COST
6.5	EASE OF USE
6.8	INTEROPERABILITY
6.5	PERFORMANCE

RATINGS ARE BASED ON A 1-TO-10 SCALE, WHERE 10 IS BEST.

Would you buy this product again?



REASON GIVEN IS THE MOST FREQUENTLY STATED ANSWER

8 ESSENTIALS of DISTRIBUTED RDBMS

CONTINUED FROM PAGE 112

higher levels of granularity.

Details of design flexibility, installation and management facilities, error detection and recovery, data integrity enforcement and performance overhead all differ among these products.

5. PERFORMANCE FEATURES

There are several ways in which a DBMS might improve performance. Among them are fragmentation, replication and distributed query optimization.

Fragmentation is the ability to partition a table into subsets of rows or subsets of columns and place these subsets in different physical locations.

While some products support manual fragmentation at a single site, such as Informix-OnLine and Tandem Computers, Inc.'s NonStop SQL, distributed and automatic fragmentation is not supported today.

Replication, not to be confused with asynchronous replication, is the ability to maintain a set of distinct physical copies of a table that are automatically kept in synchrony by the DBMS, regardless of physical location.

Placement of fragments and replicas could be either manual or automatic, the goals being to minimize disk I/O and network traffic and increase parallelism.

Replication can be simulated in some products by creating triggers, although this may leave integrity holes if updates are not done via two-phase commit.

Distributed query optimization and execution takes best advantage of physical resources such as multiple CPUs, data location and network loads. When a DBMS supports multisite read, multisite write and multisite read/multisite write statements, optimization is much more complex than it is for single site versions.

Most products such as Oracle 7 simply divide a distributed query into single-site subqueries that are then individually optimized. This simply does not qualify as distributed query optimization. A higher degree of distributed query optimization is provided by products such as Informix-OnLine, OpenIngres and Supra Server.

ADMINISTRATION AND SECURITY

Systems administration and security facilities are particularly weak among today's DBMS products. While some support for remote start and stop is usually provided, coordinated start and stop of multiple sites usually is not.

Similarly, coordinated backup, restore and recovery are frequently weak. In general, these are needed to ensure global database consistency, as well as to ease systems administration.

Vendors sometimes appeal to **local autonomy** as the reason that current products are weak in this area. This simply evades the issue of how difficult it is to manage a distributed database environment when systems administration and security facilities are incapable of treating a distributed database as a single logical entity.

Failed distributed transactions are particularly problematic in today's products. While two-phase commit can cover most failure modes, all implementations have at least one failure mode that results in either halting the system or a lack of global consistency.

DISTRIBUTED DBMS TERMINOLOGY PRIMER

It's even more complicated than you think

Local autonomy means that local database data (and by implication, data definitions, authorizations, integrity constraints, etc.) is locally owned and managed.

Physical construct is the location of the data, its physical storage format or the methods used to access the data.

Logical construct is the definition of a table, column or integrity constraint. The way such a definition is implemented is a physical construct.

Remote request support allows a single SQL request to be processed at a single remote location.

Remote transaction capability allows a transaction consisting of multiple SQL requests to be processed at a single remote location.

Distributed transaction support allows a transaction consisting of multiple SQL requests to be processed at multiple locations (local or remote). Each SQL request can be processed only at a single location, but different requests within the same transaction can be processed at different locations.

Distributed request allows a transaction consisting of multiple SQL requests to be processed at multiple locations (local or remote). Each request can be processed at multiple locations. Of these last four items, a distributed request is the most difficult to implement.

The means for detecting and recovering failed transactions are still primitive, often requiring detailed manual analysis of transaction and error log entries.

Deadlocks in a distributed environment can cause severe system degradation. Provisions must also be made for either global deadlock avoidance or global deadlock detection and recovery.

Vendors usually implement a time-out mechanism, incorrectly referring to it as a means of deadlock avoidance; it is not because it only ends a deadlock if one happens to exist, and a time-out cannot differentiate between long-running queries and a true deadlock condition.

Few, if any, DBMS products handle distributed deadlock avoidance, detection or recovery.

7. AVAILABILITY AND AUTONOMY

Local autonomy does not mean the local owner cannot temporarily delegate management to a remote site. Instead this delegation is an efficiency measure that should not prevent the local database from continuing operation in case it becomes disconnected from remote sites.

It should always be possible for local operations to be performed and controlled locally, although they may be performed and controlled remotely for efficiency reasons.

True support for local autonomy would permit a high degree of system availability because it implies the system is less vulnerable to a single point of failure and bottlenecks.

In order to avoid reliance on a particular remote site, the DBMS must support distribution of most functions including dictionary management, query processing, concurrency control and recovery control.

The implementation must not assume that any logical reference has any particular locality, a requirement that is routinely violated in today's products.

By limiting the impact of physical implementation and configuration, a DBMS administrator can curtail the need for planned system shutdowns.

Adding, changing (upgrading software versions or hardware, downsizing hardware and so on) or removing a site, node or database should not cause a disruption to the rest of the system, nor should creating or destroying fragments and replicas or destroying other database objects such as tables and indexes.

8. INTEROPERABILITY

At the platform level, interoperability involves hardware independence, operating system independence and network independence.

Regardless of the mix of hardware, operating systems or networks selected in a distributed environment, the DBMS software should work the same way. Similarly, if these are changed at any time, other nodes and sites should not be affected.

Most DBMSs have some behavioral dependence on the platforms, often in terms of the number of locks and files available and therefore the complexity of transactions that can be processed. In addition, certain functional features may not be available on all platforms; SQL syntax may differ slightly and storage management may cause differences in which errors can occur under a given circumstance.

DBMS interoperability is intended to provide uniform access to multiple DBMS products in a single distributed environment.

Interoperability has been addressed through a combination of public standards such as ANSI SQL, X/Open Co.'s Relational Database Architecture and the Open Software Foundation's Distributed Computing Environment; proprietary standards such as Microsoft Corp.'s Open Database Connectivity, Oracle's Glue, Borland International, Inc.'s Integrated Database Application Programming Interface and IBM's Distributed Relational Database Architecture; and gateway technology.

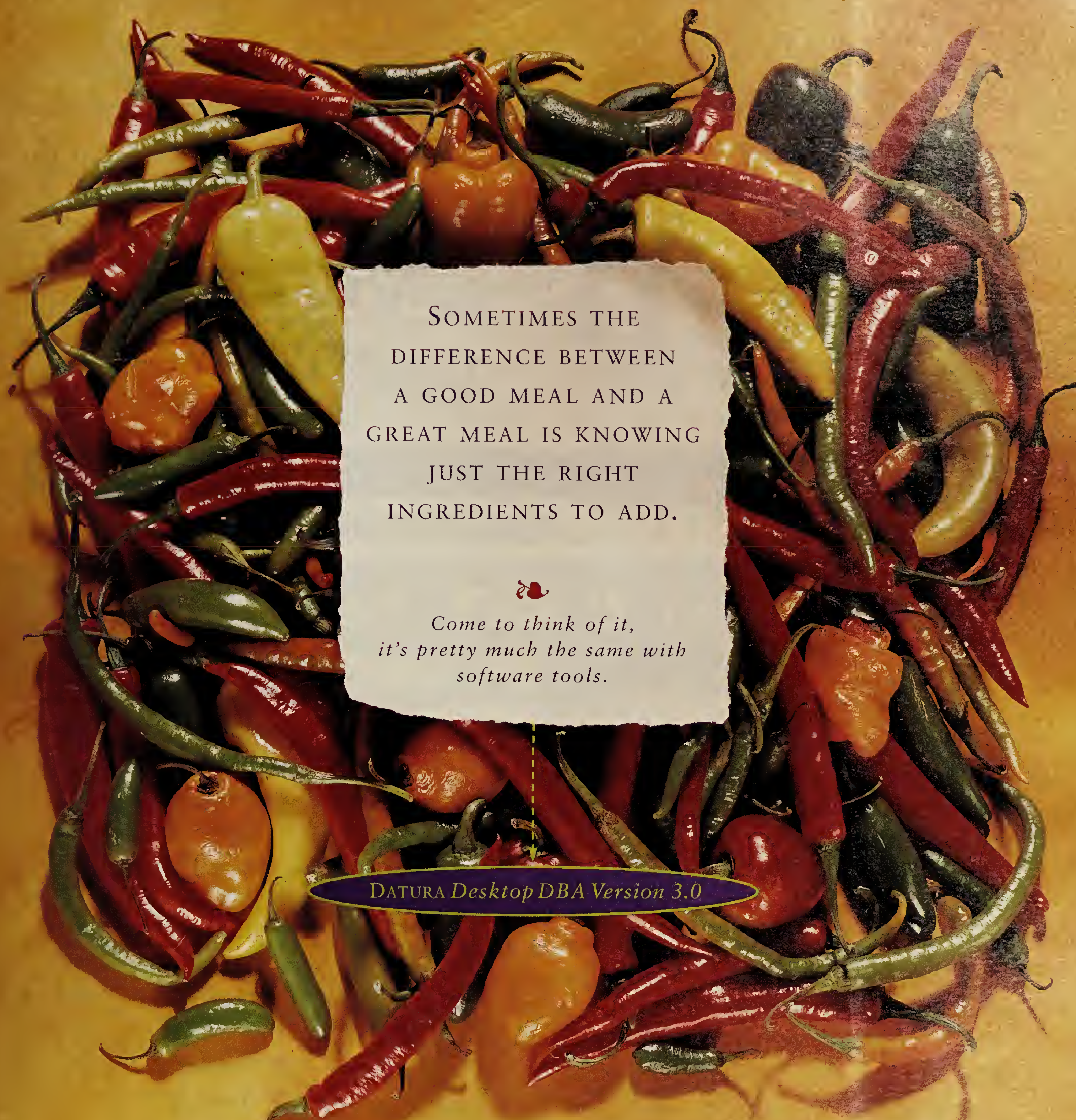
Almost all DBMS products support standards in an attempt to provide a common set of syntax or formats and protocols, but these usually do not address behavior.

Also, they tend not to address product-specific extensions, providing only a least-common-denominator approach to interoperation.

By contrast, gateway technology, such as that of ASK, Oracle and Sybase, attempts to support interoperation by translating syntax, formats and protocols among DBMS products.

However, even gateway products typically restrict the degree of interoperation, often failing to support all SQL constructs and data types or not addressing differences in error and recovery management. ■

McGoveran is president of Alternative Technologies, a Boulder Creek, Calif., relational database and client/server consulting firm founded in 1976. He is publisher of the Database Product Evaluation Report Series.



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Page 134

Cincom's Supra Server

Database delivers reliability, value

Computerworld's Firing Line is an evaluation based on interviews with major users at corporate and educational installations. The product under evaluation is being used in live application environments.

- *Cincom's Supra Server Version 2.x provides outstanding reliability and integrity, evaluators said.*
- *They also said cost, installation and end-user tools were only slightly better than expected.*

Although it is a relatively low-key database vendor, Cincom Systems, Inc. has the distinction of being the first software-only database company.

Cincinnati-based Cincom was also one of the first database vendors to supply a two-phase commit architecture for transaction processing.

Also a supplier of application development and querying tools, Cincom makes its Supra Server database for a variety of platforms, including IBM mainframes, more than 15 Unix platforms, Digital Equipment Corp.'s VMS, OS/2 and other environments. Pricing ranges from $1,500 to $150,000, depending on the platform.

Evaluators for this survey included technical and management personnel at a systems integration house, a regional utility, a federal government agency and a manufacturer. All had been using Supra Server Version 2.x for more than six months. Configurations ranged from a large IBM mainframe shop (the government agency) to smaller installations with IBM RS/6000 machines running AIX.

The format for this evaluation was created with assistance from Howard Rubin Associates and Technology Investment Strategies Corp.

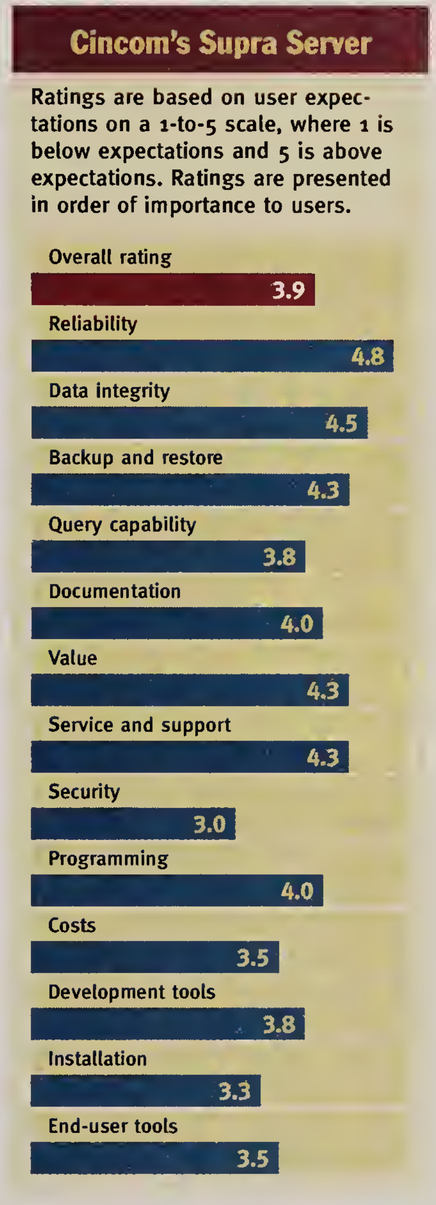
Reliability

Supra Server is divided into several isolated components to ensure reliability of applications. These include a Distributed Relational Data Manager for relational views of the database, a Dynamic Physical Data Manager to manage physical data and a Global Directory for security. The evaluators said Supra Server reliability exceeded their expectations.

Integrator: "It never shut down, even in work load tests with 5,000 record transactions."

Data integrity

Supra Server supports a two-phase commit distributed database architecture. It also includes "transaction partnering," which causes all database nodes to commit the transaction if only a single node commits, according to Cincom. The evaluators said integrity exceeded their expectations.



Cincom's Supra Server

Ratings are based on user expectations on a 1-to-5 scale, where 1 is below expectations and 5 is above expectations. Ratings are presented in order of importance to users.

Utility: "Every night, we update all summary tables, delete every transaction, reload them and do two huge updates. It has never failed."

Government agency: "We have never lost or corrupted any data."

Query capability

Evaluators used a number of query tools, including Gupta Corp.'s SQLWindows, which is available directly from Cincom.

Integrator: "The [query] tools are better than Oracle tools."

Manufacturer: "We are heavy into SQL, and we have always been able to do what we wanted to do."

Documentation

One evaluator said he was inundated with documentation for Supra Server. All evaluators said documentation was more than sufficient.

Government agency: "We would prefer [documentation supplied on] CD-ROM."

Service and support

The evaluators said technical support was needed infrequently.

Manufacturer: "The only time we call [for technical support] is when we use a new feature. It's usually our fault."

Security

Supra Server provided adequate security. All evaluators primarily relied on application and operating system security.

Utility: "We handle security internally in our applications by checking the user log-in against an authorization table at the application layer."

Programming

The evaluators used a number of tools, including Cincom's Mantis. Compatibility with ANSI SQL was very good, they said.

Government agency: "We use [Cincom's] Mantis. We used Cobol before, and all of our maintenance is in Cobol."

Costs

Costs were reasonable, the evaluators said. They considered costs to be less than competing database offerings.

Integrator: "It costs less than we anticipated, and some of our clients order more because of that."

Development tools

With support for SQL and Open Database Connectivity (ODBC), Supra Server supported many development tools from third parties.

Integrator: "Cincom has a wide variety of tools, and there are a lot of hooks into other tools."

End-user tools

Supra Server supports a number of query tools from Cincom and from third-party developers. The evaluators generally provide applications rather than tools to end users.

Government agency: "EASY is the end-user query tool. The users seem to have no problem with it." ■

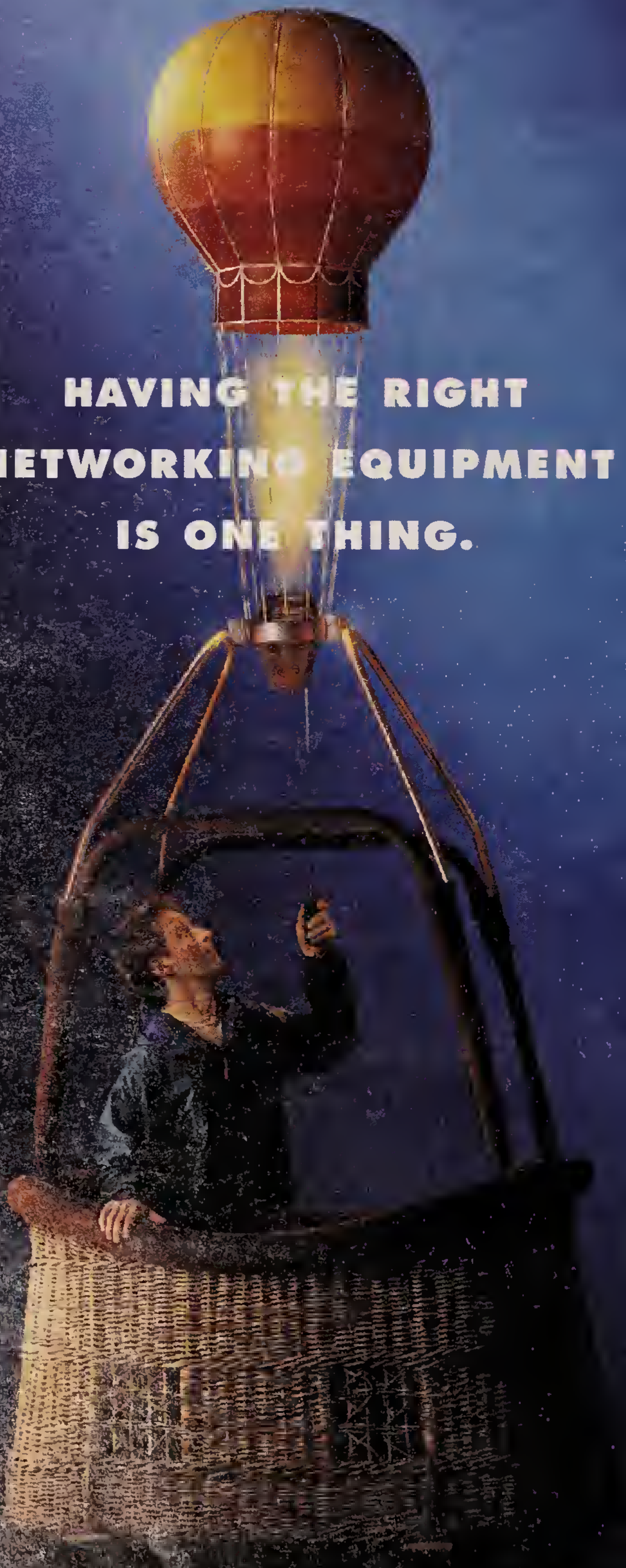
Written by Computerworld *senior editor Garry Ray.*

Cincom responds

Alyssa Dyer, Cincom's manager of product and business management, responded to issues raised in this evaluation.

Security: Supra is a Federal Information Processing standard and SQL '92-compatible database, so we support anything there is in terms of security. We are currently working on C2 and B1 security. For the average commercial user, we have already added hooks to external security packages.

Interoperability: We support ODBC, and our SequelLink product allows us to interoperate with Oracle Corp., Sybase, Inc., Informix Corp. and other major database products. We also have connectivity to DB2. We are working on extensive interoperability through our own technology for future releases.



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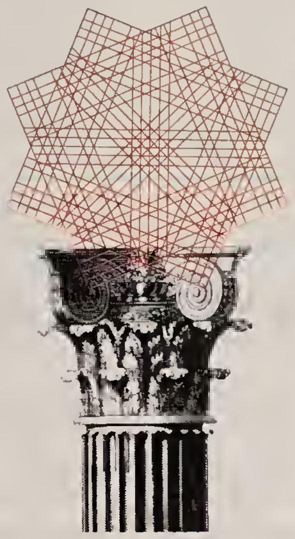
HIGH-TECH HEROES

In a ceremony tonight in Washington, *Computerworld* and the Smithsonian Institution's Museum of American History will present awards to men and women who are using technology to improve the quality of life for all of us. These heroes are using the latest technical means to tackle disease, education problems, environmental issues and handicaps, oftentimes with volunteer staffs and limited budgets.



On the following pages, we'll introduce you to the 50 finalists (profiling six of them) for the Sixth Annual *Computerworld* Smithsonian Awards.

While not everyone will walk away with an award this evening, in our eyes, they are winners all.

Medicine

System lets paralysis, stroke patients stand tall

Six years ago, Dan Kemp's future looked extremely bright. Then a 29-year-old private first class in the U.S. Army, Kemp was two weeks shy of graduating at the top of his advanced telecommunications class and awaiting his next set of orders.

But Kemp's life took a sudden and drastic turn one night in May 1988. Returning to Fort Gordon, Ga., with a few of his comrades after spending a night off base, the driver of the jeep in which Kemp was a passenger fell asleep at the wheel, causing the vehicle to flip over. Kemp's spinal cord was severed, paralyzing him from the waist down.

Down but not out, Kemp and other patients at the Veterans Administration Medical Center in Cleveland have recently received a sprig of hope. The center's Gait Laboratory has been treating participating paraplegics, quadriplegics and stroke victims with a computer-assisted system called Functional Electrical Stimulation (FES).

With FES, thin stainless steel wires are inserted into patients' muscles to electrically stimulate groups of lower-body muscles. The system, which is programmed to cause certain muscle groups to contract in sequence, has enabled people such as Kemp to stand, walk and climb steps again.

Although the FES system is still being fine-tuned, its developers have brought it a long way since a 16-channel walking system was first implanted into a patient in 1980. Since then, researchers at the motion-study laboratory have ramped up to a 48-channel system, which provides the user with a considerably smoother gait by preprogramming the Digital Equipment Corp. VAX software to activate a greater number of muscles than before.

VA Medical Center

▲ **The VA Medical Center's** *computer-assisted Functional Electrical Stimulation system stimulates muscles electrically to help paraplegics, quadriplegics and stroke victims stand and walk.*

Most of the 30 patients who have used the system typically walk between 1,000 and 2,000 feet, although one patient managed to cover 4,800 feet—nearly one mile. "Our goal is to make it as smooth and cosmetically appealing as possible," says Paul Miller, an exercise physiologist at the facility.

The system has also benefited stroke victims who have lost control of certain muscle groups. "The stimulation gives the person more stability when they're walking," notes Jennifer Hull, a physical therapist who works with stroke victims at the center.

After using the FES system for the past year, Kemp, 35, has more energy to run his 3-year-old trucking business from his home in Taylor, Mich. Kemp's greatest accomplishment, he says, was in August when he stood for the first time since the injury. But he's determined to reach even loftier heights.

"Eventually, one day in my lifetime, I will walk again," Kemp says. "It's not a matter of 'if', it's a matter of 'when.' "

— Thomas Hoffman, senior correspondent

Finalists for the 1994 Computerworld Smithsonian Awards

BUSINESS & RELATED SERVICES

Kmart Corp.
A graphical user interface system that gives managers a sense of product sales in any Kmart location.

LDS Hospital
A database that stores patient records and has an expert system that aids in medical decision-making.

Mervyn's
A system that lets inventory managers predict demand for merchandise colors, sizes and patterns.

Pepsico Food Systems
Re-engineering to lower costs, conserve natural resources and improve efficiency.

Qualcomm, Inc.
Enhancing quality by increasing the capacity of cellular systems by 10 to 20 times.

EDUCATION & ACADEMIA

Institute for Research on Learning
Bringing computer resources for learning math to needy schools.

National Captioning Institute, Inc.
Working on real-time captioning for the hearing impaired.

National Geographic Society, Educational Media Division
An electronic curriculum designed to interest children in science.

Syracuse University
Helping K-12 teachers find educational information on the Internet.

University of California at Los Angeles
See story page 120.

ENVIRONMENT, ENERGY & AGRICULTURE

Ariel Research Corp.
Helping companies comply with chemical regulation worldwide.

Los Alamos National Laboratory
Connecting remote environmental monitoring stations with a central data archive.

Marine Spill Response Corp.
See story page 120.

Continued on page 120

Continued from page 119

South Coast Air Quality Management District
Helping firms comply with air quality regulations.

The Nature Conservancy
Bringing together data centers with biological and ecological information to help with biodiversity preservation efforts.

FINANCE, INSURANCE & REAL ESTATE

American Express Co.
Using a single global data system to eliminate repetitive tasks and enable personalized service.

Connecticut Mutual Life Insurance Co.
Standardizing associates' tools to improve service and productivity.

General Motors Corp.
Financial tracking system that reduces administrative follow-up.

National Association of Securities Dealers
Creating a floorless trading environment.

Visa USA
Helping cardholders and merchants through point-of-sale terminals and imaging technology.

GOVERNMENT & NONPROFITS

CHCS Program Office, Assistant Secretary of Defense (Health Affairs)
Automating functions from patient administration to clinical services.

CityNet
See story page 121.

Maryland Department of Human Resources
Providing the needy with debit cards to get multiple social service benefits.

Massachusetts Executive Office of Environmental Affairs
Merging 11 environmental databases for a unified view of Massachusetts' environmental status.

Milwaukee County Sheriff's Department
Integrating imaging and bar codes to provide official users with criminal and civil justice information.

MANUFACTURING

Convex Computer Corp.
Creating customer-driven products.

Eastman Kodak Co., Dental Division
Creating a flexible, consolidated product development system.

Ford Motor Co.
Developing high-quality vehicles in minimal time.

Mazda U.S. Division System Services
Improving vehicle quality by replacing time-intensive manual services.

Silicon Graphics, Inc.
Reducing product design time.

Environment

Fast response for huge oil spills

Just two months after the Exxon Valdez gutted itself on a reef in Alaska's Prince William Sound in 1989, a task force assigned to research the resources available to respond to a catastrophic oil spill reported its findings. It concluded that neither the government nor industry had the capability to effectively handle enormous tanker spills such as the 260,000-barrel Valdez disaster.

That sobering realization prompted the formation of the Marine Spill Response Corp. (MSRC) and its Spill Operations System (SOS). SOS was developed to correct the two major weaknesses associated with any emergency response: communications and logistics.

"Because the [SOS system] tells us the location and status of every piece of equipment in our company, we are able to respond [quickly] with the resources required to recover spilled oil effectively," says Barry Berkowitz, director of information systems at MSRC.

Technology has brought speed and efficiency to operations that were previously coordinated with paper and radio transmissions.

The faster response reduces the time the oil has to spread, lessening the environmental impact, Berkowitz says.

SOS contains 12 plans based on predeveloped scenarios. When activated, each plan provides decision makers with a set list of required equipment and identifies equipment warehouses in the spill vicinity.

SOS has replaced printed charts and plastic overlays with digitized coastal maps that constantly update the environmental and economic resources at risk. This geographic information system displays oil spill information and helps plan and map oil spill response activities. "Information points on a map can change with the seasons; this system always remains up-to-date," says Bob Pavia, chief at the U.S. National Oceanic and Atmospheric Administration, who used SOS during a spill off Puerto Rico last January.

SOS aided Pavia in recovering a quarter of the spilled oil and accounted for less than 3% of the spill's total costs.

The system uses satellite and wide-area network communications to transfer the same graphic and reference information used at MSRC headquarters to any of its five regional centers or 16 response vessels. This way, a spill command center can be set up at any one of the outposts. This mobility wasn't possible over land lines and ship-to-shore radio.

Luckily, the Puerto Rico spill remains the only live test of SOS capabilities. "Like a firehouse, you hope you never have to use it," Berkowitz says.

—Kevin Burden, research coordinator

Education & academia

LA rebuilds with citizens' input

Two years ago, horrified citizens sat glued to their televisions as downtown areas of Los Angeles were destroyed by rioting, looting and fire. Today, the city's poorest inhabitants will soon watch new, rebuilt neighborhoods take shape on a different kind of TV screen.

Not only will residents of the Pico-Union district — a poor, mostly Spanish-speaking immigrant community next to South Central Los Angeles — see new streets, stores, business areas and parks, but for possibly the first time they will have a strong voice in designing their own landscape.

A new urban planning and simulation system will soon let Pico-Union residents and others travel through three-dimensional, photo-realistic computer images of the community on a large TV screen or high-speed graphics terminal. Residents will be able to examine city plans and make suggestions or changes — all interactively and in real time.

Proponents of the project laud its ability to give voice to people regardless of social, economic or ethnic heritage. One backer is Mike Hernandez, a Los Angeles city councilor whose district includes Pico-Union.

The Urban Simulation Environment is the work of a dozen volunteer professors and students at the University of California at Los Angeles Graduate School of Architecture and Urban Planning. The developers hope this attempt at high-tech consensual planning will eventually revolutionize and democratize how communities around the world handle urban planning and design.

A big strength, says project director Bill Jepson, the school's director of computing, is the elimination of complex blueprints, charts and other hard-to-understand representations typically used to show new city designs. "The television format is readily understandable to everyone," Jepson says.

The approach, adapted from advanced military flight simulations, uses a Silicon Graphics, Inc. "reality engine" — a high-speed image processor — to merge and store vast amounts of visual and sonic data obtained from videotape footage, geographic information systems, textual databases and other sources. A $175,000 grant from the city of Los Angeles supports the effort.

An interactive 3-D *urban planning system is letting Los Angeles residents have a voice in rebuilding their city*

President Clinton and Vice President Al Gore saw the UCLA system demonstrated last year and were reportedly impressed. The Los Angeles Metropolitan Transit Authority has shown serious interest in using the simulator to help create the city's planned $30 billion subway. Jepson said he hopes other agencies will follow.

"Without high technology of this nature," Jepson says, "it is unlikely that cities will be able to respond to the complex urban planning needs of the future."

—Joseph Maglitta, senior editor

Science

Gene database helps in war on disease

Decoding human DNA is a task that will take decades. But the federally funded Genome Data Base (GDB) project at Johns Hopkins University in Baltimore is already making the sum total of the world's human gene data available to researchers worldwide.

Using the Internet as one of several gateways, thousands of scientists, medical researchers and physicians around the world can access the GDB for information on gene mapping and text descriptions of gene structures.

Genetic counseling, pharmaceutical therapies and scientific sleuthing for the causes of cancer are all expected to benefit from the online database.

But the GDB is very much a work in progress. "There are estimated to be 60,000 human genes scattered amongst all the chromosomes," says Dr. David T. Kingsbury, managing director of the 4-year-old on-line database that supports the international Human Genome Project, for which the GDB is the central repository. "At the moment, we know about 10,000 of them."

The work is already yielding results, allowing researchers to find a correlation between diseases and specific genetic structures. About a year ago, amyotrophic lateral sclerosis — commonly known as Lou Gehrig's disease — was mapped onto specific genes. "It turns out that at the very site the disease was located, there was an enzyme we already knew about," Kingsbury said, citing a possible causal link. "Once you know the mechanism of how a disease occurs, you can start to do the dreaming about how to cure it."

The mechanism of the GDB is straightforward. A series of Unix servers from Sun Microsystems, Inc. hosts Sybase, Inc. relational databases that can be accessed from a variety

Arts & entertainment

Welcome to the virtual museum

Imagine you're back in your 10th grade world history class studying Egyptian temples. But this time around, instead of a field trip to the closest museum, your teacher is planning a trip to the Greco-Roman period of Egypt, about 4,000 years ago.

Such time travel may have been impossible just a few years ago, but thanks to a mix of virtual reality technology and telecommunications, your class may be able to drop in and explore ancient places anytime.

The museum of the future has entered the present at Carnegie Mellon University in Pittsburgh, where researchers have created a "networked virtual art museum" that enables users to walk through and explore a digital representation of the Temple of Horus, a structure built sometime between 300 B.C. and 300 A.D.

The project's creators say they hope it will become a model for participatory long-distance learning over networks.

Viewers don a head-mounted display and use a joystick to move themselves from the exterior of the virtual museum into the lobby and then into the Temple of Horus Gallery. From there, viewers find themselves just outside the Egyptian temple, where there are open-air courtyards with interactive murals and sculptures. They then go into an innermost sanctuary.

Along the way, there are three agents, or tour guides, that document the history of the temple.

"The accurately modeled space was most interesting, with rooms lined with huge columns and open ceilings," says Richard Roller, director of information systems at the Solomon R. Guggenheim Museum in New York. The Temple of Horus made its debut to sellout crowds last October at the Guggenheim Museum SoHo.

The virtual temple was codeveloped by Carl Loeffler and Lynn Holden at the Studio for Creative Inquiry at Carnegie Mellon. Loeffler, who is project director of telecommunications and virtual reality, provided the technical know-how, while Holden, who is an Egyptologist, worked to make the program realistic.

A virtual reality recreation *of the ancient Egyptian Temple of Horus may be the first step to on-line 'virtual art museums'*

According to Loeffler, the virtual museum uses a distributed client/server architecture that will potentially enable unlimited participants to interact in the same virtual world.

"What we were after with the virtual museum is to see if it was symbolic of what the future museum will look like," Roller adds. "Will it be on-line? Available on the Internet? Will it look like museums today? It's a launching point. Hopefully people will take this idea and go with it."

—Michelle J. Keyo, copy editor

ILLUSTRATIONS BY PETER ALLSBERG

of wide-area networks. Users can launch client/server queries against the genome database or browse the database using the Internet's icon-based Mosaic interface.

Client/server technology is very much an enabling factor, allowing scientists in nine Human Genome Project sites — including sites near London, Paris and Tokyo — to create and maintain a common view of the world's knowledge about human genes. Updates occur daily, which is expected to double the 1G-byte database's contents this year.

Some users say they simply could not conduct their research without the GDB. "The genome database is a clearinghouse," explains David J. Galas, vice president for research and development at Darwin Molecular, Inc., a Bothell, Wash., genetic therapies start-up. "Initially, it was the gene-mapping database, but now it's moving into other areas as we get more and more detailed information about the chromosomes."

Users of the GDB agree on the power of its accumulated data to change the world. "This is really going to open up all of molecular biology," says Peter Cartwright, director of informatics at the University of Utah's Human Genome Center in Salt Lake City. "Once we know the [gene] sequence and once we begin to unravel how that sequence affects the construction of proteins," Cartwright says, "we're really going to open the door to understanding human biology in a way it's never been understood before."

—Jean S. Bozman, senior West Coast editor

Government & nonprofits

Keeping in touch with city hall

When residents of Cupertino, Calif., had complaints about refuse pickup earlier this year, they did not have to call for an appointment at city hall, hire a lobbyist or attend a formal hearing. They just signed on to the community's on-line information service, known as CityNet, for a spirited question-and-answer session with the public works director, says local activist Nadine Kazuko Grant.

In fact, the low-cost CityNet service is transforming the way Cupertino's residents deal with city hall and one another. When she's not using CityNet to organize grassroots civic campaigns, Grant uses it to send electronic mail to her son, who is away at school, via an Internet gateway.

The beauty of CityNet is that its interface is so easy to use — users just click on an icon to send a message to a particular school or office in city hall — and not intimidating to computer novices, Grant says. "Our senior citizens just love it," she adds. "Who says you can't teach old dogs new tricks?"

In essence, CityNet is a dial-up network that uses PCs as the "information appliance" linking residents with their schools and government. Among the many offerings on CityNet are school newspapers, homework assistance, local business permits and information from the sheriff's department.

The project has been a runaway success, adding 100 new users a month and creating a forum where "upset parents have access to the school system from top to bottom ... teachers, principals, administrators and the board of education," says Wally Dean, a city councilman and co-developer of the project.

To make it affordable, the subscription cost is set at a rock-bottom $20 per year, and public-access PCs are being installed at libraries, senior centers and schools, Dean explains.

Because 60% of Cupertino's residents have home computers, the bigger issue was making sure they had high-speed modems. To address that concern, CityNet made a deal giving users a discount on their modem purchases.

Now, the big challenges boil down to technology — such as getting enough bandwidth for interactive and graphics applications — and money. CityNet is "pressing the technology envelope" while at the same time being run by an all-volunteer staff, Dean says, which is not a viable combination.

"You can't continue the pace at which we've been moving and expect people to work for free," Dean says, referring to the need for some financial aid. "We've lost some talented people who couldn't afford to do this and had to move on."

—Mitch Betts, national correspondent

MEDIA, ARTS & ENTERTAINMENT

Carnegie Mellon University	See story this page.
DirecTV and National Rural Telecommunications Cooperative	Delivering more TV choices to rural Americans.
Fairway Technologies	Enabling on-demand production of entertainment software in retail stores.
Industrial Light & Magic	Created dinosaurs in the movie *Jurassic Park* that were cheaper and more realistic than earlier types.
Maxis	Simulation software for virtual reality learning.

MEDICINE

Cuba Memorial Hospital	Giving rural residents access to better medical care via videoconferencing.
John Hopkins University	Helping doctors diagnose retinal disease better.
Klinikum der Stadt Mannheim	Simulating potentially dangerous birth situations to determine if special procedures are needed.
Mayo Clinic	3-D image analysis for planning and performing difficult surgery.
Veterans Administration Medical Center	See story page 119.

SCIENCE

Battelle Memorial Institute	Enabling storage of huge quantities of data in limited space with optical digital recording.
Brown University	Detecting failure resistance in metal structures.
Du Pont Co.	Exploring alternatives to chlorofluorocarbons.
John Hopkins University	See story page 120.
Los Alamos National Lab	Simulating ocean currents and temperatures to understand global weather.

TRANSPORTATION

Hong Kong International Terminals Ltd.	Scheduling container terminal operations using AI.
Northwest Airlines	Automating call routing and reducing customers' time on hold.
Qualcomm, Inc.	Using satellites to keep trucks and dispatchers in constant contact.
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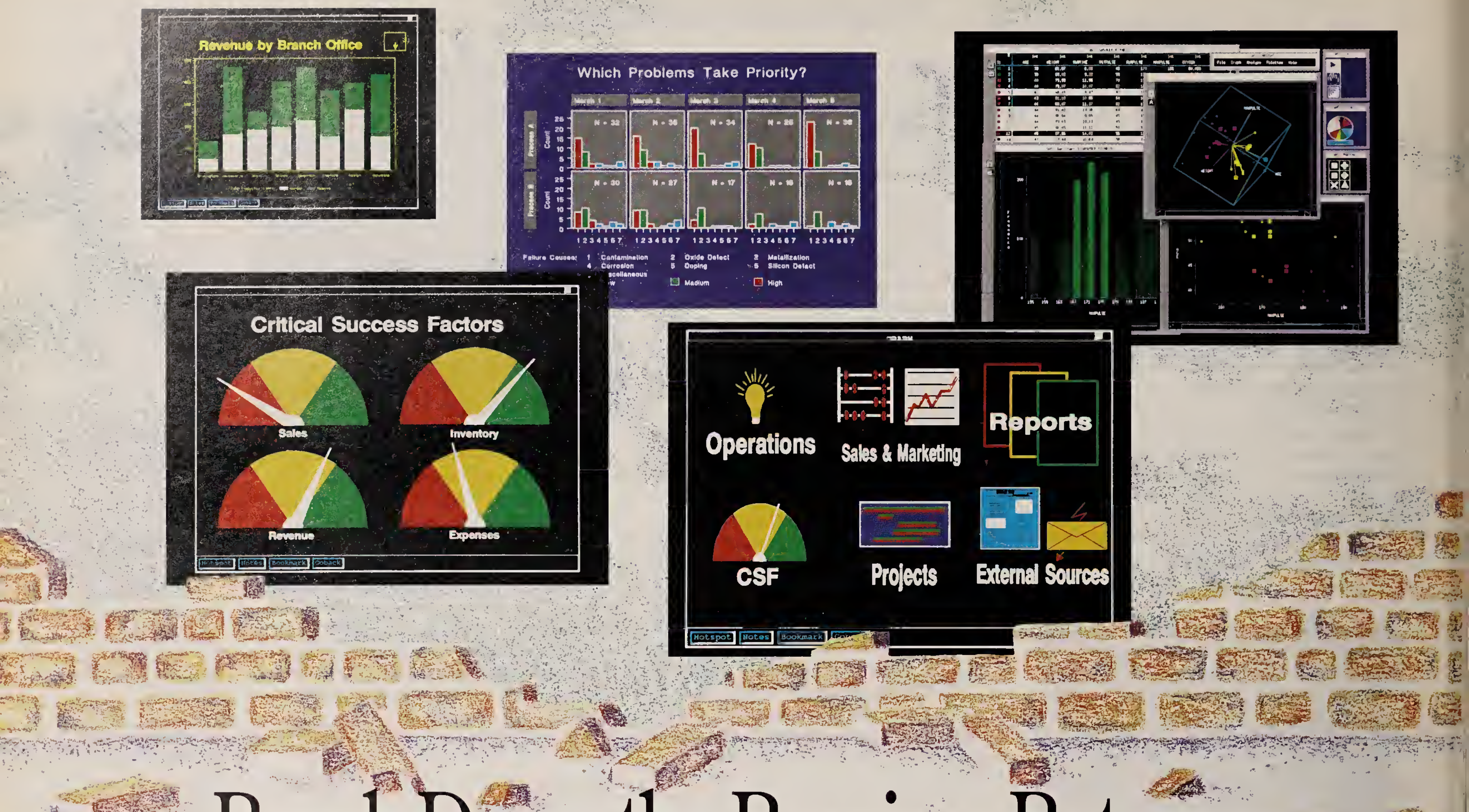

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- Companies where computer career students want to work. And their top choices for: Information Systems, Engineering, Sales & Marketing, Technical Support, Research & Development.
- Information Systems salaries from Computerworld's annual survey with the Association for Systems Management
- And much more!

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Making THE GRADE

If you're planning on a career in Unix systems administration, expect to be a jack-of-all-trades. Not only are employers looking for Unix aficionados but network and application development know-how is also hot.

To get a handle on the in-demand skills for Unix administrators, Computerworld *asked information systems managers about what they look for and how the requirements are changing.*

By Emily Leinfuss

Q. What technical qualifications must Unix systems administrators have?

A. An overall knowledge of the Unix kernel, syntax and performance tuning are key skills, says Tony Morgan, information systems manager at SAAD Healthcare Services in Mobile, Ala. Morgan is referring to an ability to navigate through the operating system, understand performance issues, buffering, I/O and disk access.

In addition, a working knowledge of several Unix versions is a must. "Sun's Solaris, SCO Unix and HP/UX are the most common operating systems, and administrators would do well to know them all," says Quincy Leslie, a Unix consultant at Science Applications International Corp., a systems integrator for the U.S. government in San Diego.

Q. What troubleshooting skills impress you the most?

A. Flexibility, patience and the ability to work backward through lines of code to isolate a problem, says Brian Kluever, regional IS manager at the Hyatt Regency in New Orleans.

These skills came in handy when Kluever's staff rolled out an application to access the corporate wide-area network. At the same time, the corporate IS organization implemented a software fix to access the WAN using an older method. Unfortunately, the two applications looked alike, and when they were unbundled, they intermingled and brought part of the network down.

The regional Unix systems administrator stepped in and unbundled the patch by working backward through lines of code. "He was flexible and answered the same questions a thousand times until he figured it out," Kluever says.

Q. What demands does client/server place on the job?

A. "The market wants open systems where no matter which operating system is running, the enterprise can still share files," Morgan says. "Anyone who understands that and trains for it is in a marketable position." More specifically, Morgan says, anyone who has TCP/IP, Network File System and other protocol experience, as well as Ethernet or Token Ring, is more marketable.

Fundamental programming skills also come in handy, says Morgan, who recommends C and Unix scripting. "Any time an administrator learns programming, even writing reports in a fourth-generation language, he is positioned to take on more responsibility and has a better feel for the system," he says.

Q. What skill do you find most applicants lack?

A. Good communications skills, says Gordon Pryor, IS manager at Electro Wire Product, Inc. in Dearborn, Mich. "You can learn any operating system. If you only have technical skills, though, you'll be stuck in a technical job."

Pryor says he demands a balance between technical and communications skills and insists on seeing significant evidence of this on a resume.

"I look at their educational background for speech and communications classes, what associations they belong to and their experience with presentation material," he says. "That will give you a hint."

Q. What career options are available for Unix systems administrators at your company?

A. One option at Pryor's company is to move into operational management-type positions, which require planning, budgetary and people skills. "You can't be successful without being able to present your technical solution to peers and higher management," he says.

To provide a stronger career future for his technically oriented staffers, Pryor has started sending them to management skills training courses.

Alternately, Morgan says a well-rounded systems person can navigate in and out of any job at his company. However, technical and communications skills plus management ability is a must. ■

Leinfuss is a free-lance writer in Sarasota, Fla.

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Nix NetWare for OS/2

Adding NetWare for OS/2 expertise on your resume won't have companies knocking down your door. Instead, analysts recommend learning more marketable NetWare versions.

By Leslie Goff

NEED to know

Are you worried about the effect Novell, Inc.'s NetWare for OS/2 might have on your job? Don't, because it's likely to have little, if any, effect — if it even makes it to your site.

NetWare for OS/2 lets the NetWare and OS/2 operating systems run concurrently on a single server, a bonus for small to medium-size sites trying to keep hardware costs down.

It runs and is installed exactly like NetWare 4.x, except that it doesn't provide protected memory for NetWare Loadable Modules. It requires no additional NetWare training and does not change NetWare certification requirements.

Low priority

Despite reported NetWare for OS/2 sales of some $5 million last year, Novell seems to have placed a "low priority" sticker on this implementation, focusing instead on its pending UnixWare, or NetWare for Unix, according to analysts.

NetWare for OS/2 is important to Novell on two levels, says Matthew Cain, program director for the workgroup computing strategies service at Meta Group, Inc. in Westport, Conn. It's important as a means of increasing NetWare sales and as a model for future NetWare development efforts.

"NetWare for OS/2 will provide Novell a model for porting NetWare services over to other operating systems" such as Unix, Cain says. "And a number of companies, like banks, need OS/2 in small pockets. So they may only order five copies of NetWare for OS/2, but they'll order 500 copies of NetWare for DOS. It increases Novell's overall sales."

Those who do use NetWare for OS/2 are big fans of the network operating system. They say it lowers costs, lets users reconfigure each operating system's respective processing load in real time and can ease the burden of client/server management.

Sharing helps

"It gives you flexibility at a lower cost because of the sharing of the processor," says Philip Gulesian, a partner at Gulesian Associates, a consulting and Notes applications development firm in Concord, Mass.

Gulesian runs a NetWare OS/2 network internally for development work and practice management applications. "In a situation where the demand on the server — either the NetWare file server, the NetWare applications server or one of the OS/2 servers — is not extremely high, you get more back-end resource for the buck in a mixed NetWare-OS/2 environment," he says.

The ability to "configure NetWare for OS/2 on the fly" is also a bonus, Gulesian says. "You can configure it in different ways depending on your changing requirements. It provides day-to-day flexibility not available before."

NetWare for OS/2 does have its limitations, particularly in terms of the network size. Harry Lipkind, a consultant at Corporate Software, a reseller and systems integrator in Arlington, Va., says he hasn't experienced any problems with NetWare for OS/2 but cautions network managers to install adequate memory, which turns out to be 32M bytes, twice the Novell recommended minimum.

Watch the numbers

Furthermore, too many users will tax the system. "Provided you have a reasonable amount of memory, the system is very happy," Lipkind says. "A reasonable number of users depends on the platform speed and the amount of work to be done. Novell's claim of 50 users could be possible, but 20 to 40 might be more reasonable."

In that respect, NetWare for OS/2 is somewhat poorly positioned, notes Sue Bishop, director of the Boston Computer Society's networking user group and president of TIC Business Consultants in Chelsea, Mass., which specializes in network consulting for companies with 100 to 150 workstations. "The only places you see OS/2 is in networks with over 100 users," Bishop says.

"There was a lot of noise at the beginning about OS/2, but the operating system has really languished since then," Bishop adds. "We support thousands of workstations and less than 1% are OS/2-based." ■

Goff is a free-lance writer in New York.

Stay mainstream

Is NetWare for OS/2 worth considering? Sue Bishop, director of the Boston Computer Society's networking user group and president of TIC Business Consultants, says she does receive inquiries about the network operating system.

It's right for some companies — a 400-user engineering firm that already has a big investment in OS/2 applications, for example. But TIC generally doesn't advise people to use it. "If I was a supervisor in an under-100-user environment, I would be reluctant to get out on that limb right now," Bishop says. "For over 100 users, I would want to see a list of good sound business and technological reasons to go in that direction."

Matthew Cain, program director for the workgroup computing strategies service at Meta Group echoes Bishop's concerns. "LAN administrators are well advised to stick with the mainstream of Novell's offerings whereby they can gain valuable experience with components such as global directory services and the bundled MHS in NetWare 4.1." — LESLIE GOFF

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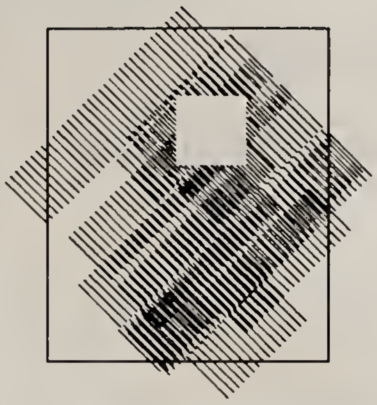

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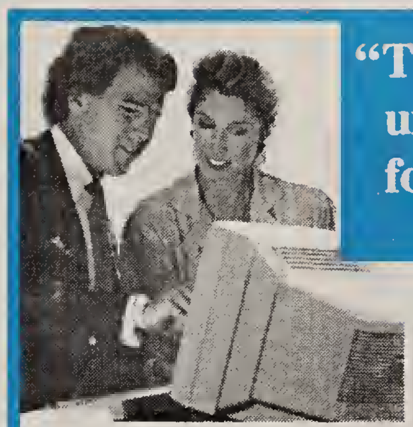

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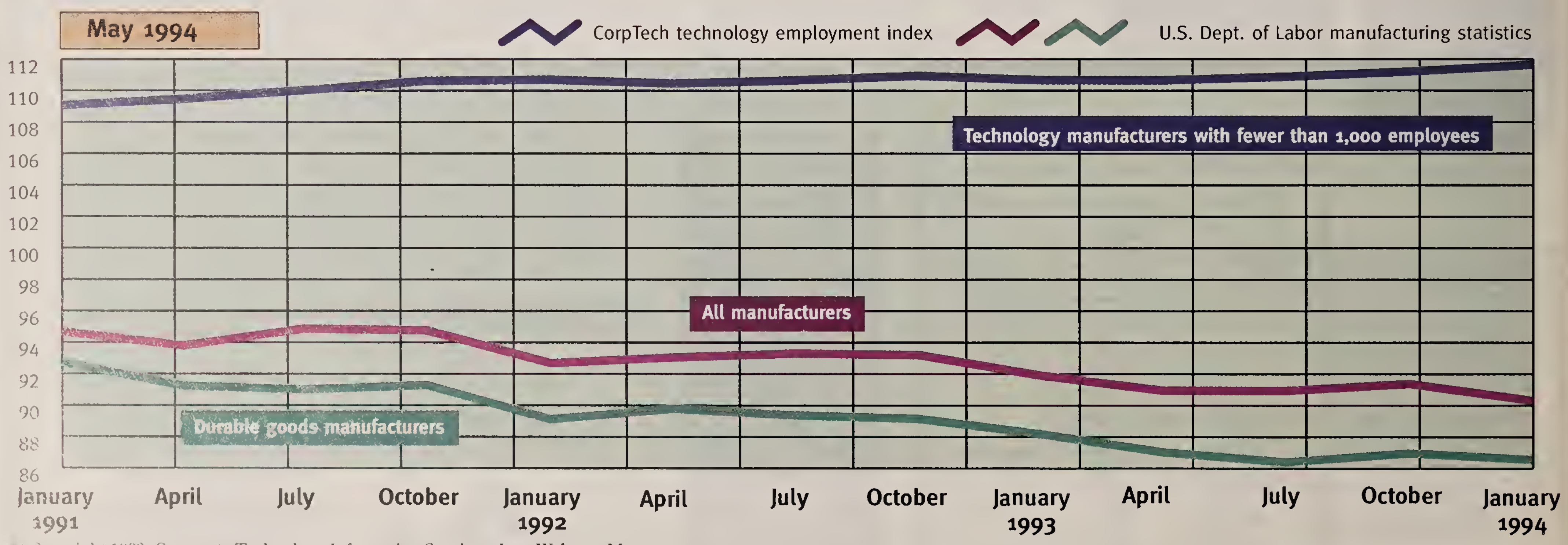

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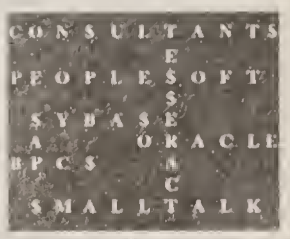
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outlook

POWER PC CLONE MARKET

Don't expect too much too soon

By Alan Radding

If IBM's dream of a robust PowerPC clone market comes true, the next generation of desktop PCs will provide power to spare on an open platform available from multiple vendors in a competitive marketplace.

The PowerPC will deliver the price/performance of Unix/RISC processors, compatibility with existing desktop applications regardless of the native operating system and a host of ease-of-use features such as response to spoken commands.

That is the plan, but the PowerPC market isn't emerging quite as IBM envisioned. The hardware vendors are exploring the PowerPC platform but have not jumped on the clone bandwagon; the operating system picture is confusing; and Apple Computer, Inc. jumped the gun, doing its own thing in a slightly different way. So much for a DOS/Intel Corp.-like clone market.

Plenty to choose from

Instead of one PowerPC market, there are two, three and possibly four depending on how you count it: the PowerPC, the Apple version, a PowerPC-based RS/6000 and even a PowerPC-based AS/400. But everything may still work out as unconfirmed reports circulate that Apple and IBM have come to a meeting of minds on merging their versions.

The PowerPC clone market refers to PCs built using the PowerPC RISC processor architecture developed jointly by IBM, Apple and Motorola, Inc. Initially, four models of the chip are planned: the 601, 603, 604 and 620. Each differs in its balance of speed and power consumption. All are 32-bit chips except for the 620, which will be 64-bit when it ships. Only the 601 is being produced today.

With the ability to run multiple 32-bit operating systems such as Microsoft Corp.'s Windows NT, IBM's OS/2, Apple's System 7 and AIX and to run 16-bit legacy software under high-speed emulation, PowerPC promises to bridge the gap between the legacy DOS/Windows world and the new high-performance 32-bit processing world.

Later this year, IBM will introduce its first PowerPC machine, expected to start at about $3,000 and include a 270M-byte hard disk, 16M bytes of memory, a CD-ROM, built-in networking, audio speakers, a microphone and Peripheral Component Interconnect slots. Essentially a multimedia machine, it is expected to run OS/2 initially, followed shortly by Windows NT. It will run existing DOS/Windows applications in emulation.

The waiting game

"1994 will not be the year of the PowerPC machine," says Jeffrey Henning, associate director of personal systems at BIS Strategic Decisions in Norwell, Mass. Although every vendor is examining the PowerPC architecture except for IBM and Apple, "none of the Top 10 PC vendors is building a PowerPC," Henning says. They are waiting to measure market interest.

The PowerPC would just be another fast computer based on an advanced high-speed chip — albeit with a striking new user interface — except for IBM's intent to cultivate a clone market by publishing the architecture specifications in enough detail for other vendors to build their own from scratch.

In addition, IBM is licensing specific implementations of the architecture, source code and chips to enable OEMs to configure and assemble clones. Ultimately, IBM expects to license its new user interface, although initially it will use that as its product differentiator.

The company has distributed more than 1,000 copies of the architecture specifications document, called the PowerPC Reference Platform, reports Gary Griffiths, director of business development at IBM's Power Personal Systems division. "We expect to see clones," he adds, although none have been announced unless you consider Apple's PowerPC-based Macintosh a clone, but it isn't compatible.

The Taiwanese computer industry, which builds about 85% of the motherboards for PC clones, has embraced the PowerPC Reference Platform, and a few clone vendors, such as Acer America Corp. and Tatung Science and Technology, Inc., are expected to be early entrants into the market. IBM's Power Personal Systems division will market end-user workstations, and it expects OEMs to jump in with PowerPC-based servers.

"1994 will not be the year of the PowerPC machine," says Jeffrey Henning, associate director of personal systems at BIS Strategic Decisions in Norwell, Mass. Although every vendor is examining the PowerPC architecture, except for IBM and Apple, "none of the Top 10 PC vendors is building a PowerPC," he notes. They are waiting to measure market interest.

The real advantage of the PowerPC platform will come from running 32-bit applications in native mode. Consulting firms such as Gartner Group, Inc. are generally advising clients to wait, expecting any market impact to be 12 to 24 months away when the native 32-bit applications become available in quantity.

Even if you did want the PowerPC, it will be somewhat hard to find initially. IBM is not expected to ship it until the fall, and the company has not finalized the distribution channel except to say it will use existing Power Personal Systems channels where appropriate, probably direct-sales channels and some value-added resellers. Don't expect to find it on retail shelves until the PowerPC has at least 5% of the market, Henning adds. A robust clone market will take some time to develop. ■

Radding is a free-lance writer in Newton, Mass.

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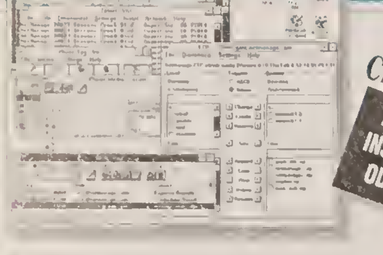

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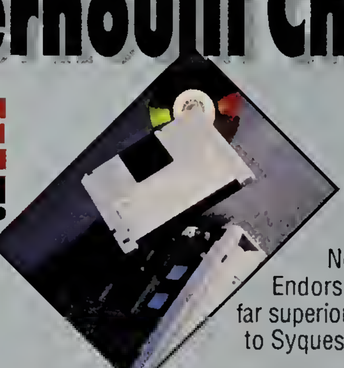

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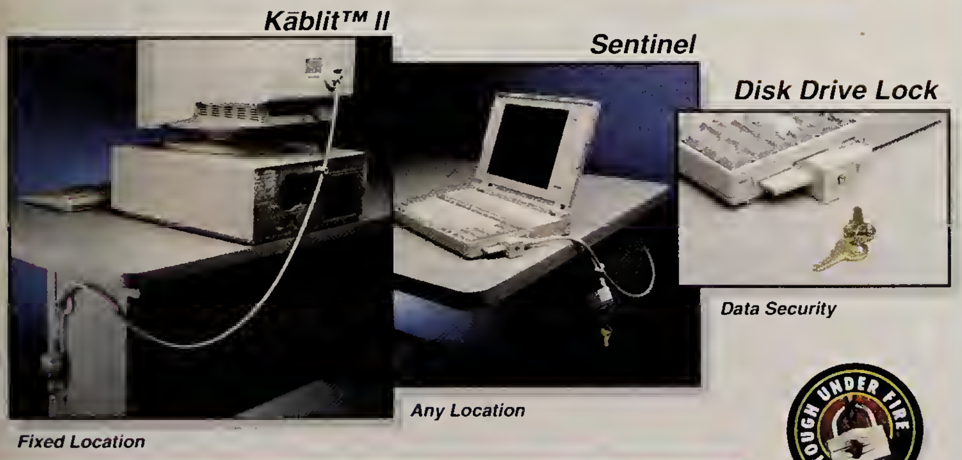

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Friday Stock Ticker

Gainers		Losers	
Percent			
CE Software	23.8	Gandalf Technologies Inc.	-25.1
Data Race Inc.	22.7	Gupta	-23.6
Micro Focus	19.7	Synoptics Communications	-21.6
Atmel Corp.	19.5	Penril Data Comm Networks	-20.7
Exabyte	16.9	Network Computing Devices	-16.7
Manugistics Group Inc.	14.3	Group I Software	-14.7
Sterling Software Inc.	13.8	Iomega Corp.	-14.3
Xilinx	13.0	Knowledgeware Inc.	-13.8
Dollar			
Powersoft	6.75	Newbridge Networks Corp.	-5.00
Texas Instruments	5.38	Synoptics Communications	-4.44
Xilinx	5.25	Progress Software Corp.	-4.00
Atmel Corp.	4.75	Gupta	-3.63
Micron Technology	4.13	Cabletron Systems	-3.25
Sterling Software Inc.	4.13	3 COM Corp.	-3.13
SynOpsys	4.00	Wellfleet Communications	-3.00
8MC Software Inc.	3.75	Lotus Development	-2.88

Industry Almanac

Did we say "super" servers?

Superservers were once touted as the next sprinters on Wall Street. Since last fall, however, the three dedicated superserver stocks have been limping.

Analysts said **NetFrame Systems, Inc.** (NETF), **Parallan Computer, Inc.** (PLLN) and **Tricord Systems, Inc.** (TRCD) have shared some sectorwide concerns but have disagreed on just where the problems lie.

"They are in a high-growth area," said Gina Sockolow, an analyst and vice president at Josephthal, Lyon and Ross in New York. "But because they are viewed as hardware companies, they tend not to get the same kind of multiple on earnings" as client/server software companies, she said.

However, another analyst disputed the high-growth tag and said superserver product offerings are targeted above the "sweet spot" in the market. He defined this area as the $15,000 to $20,000 price range where **Compaq Computer Corp.** (CPQ) is thriving. True superserver offerings can run from $30,000 to $75,000 and up.

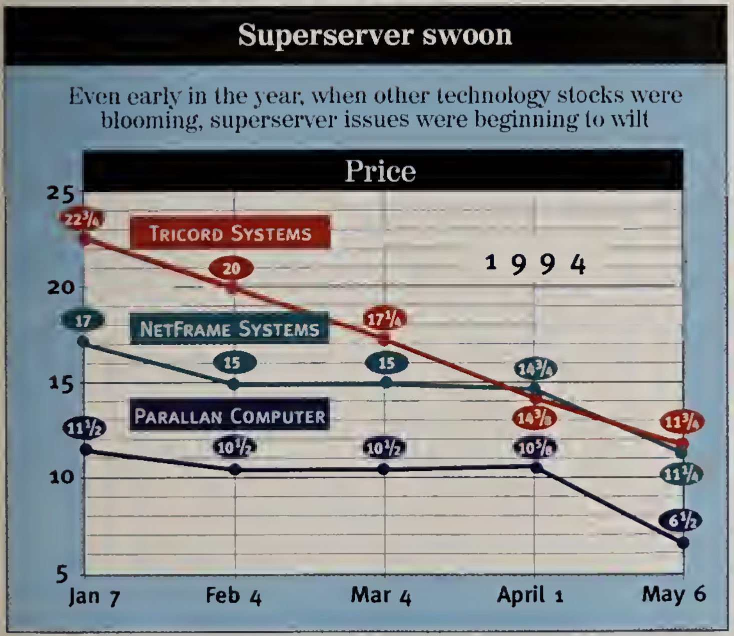
In addition, other individual challenges have arisen for each company.

NetFrame, for example, missed analysts' expectations in the most recent quarter. "This is their 'prove it' quarter," Sockolow said. She noted that NetFrame has a number of technological strengths and forthcoming sales announcements but said it could suffer further significant stock market declines if it fails to earn 20 cents per share in the current quarter.

— Derek Slater

Superserver swoon

Even early in the year, when other technology stocks were blooming, superserver issues were beginning to wilt



Communications and Network Services — OFF 1.37%

Exch	52-Week Range			June 3 3 PM	Wk Net Change	Wk Pct Change
OTC	63.75	19.63	3 COM Corp.	45.75	-3.13	-6.4
NYS	45.56	36.25	AMERITECH Corp.	39.75	0.50	1.3
NYS	65.00	49.50	AT&T	55.75	0.88	1.6
OTC	26.50	13.00	Banyan Systems Inc.	15.31	0.69	4.7
NYS	69.13	49.00	8ell Atlantic Corp.	54.38	1.88	3.6
NYS	63.88	53.00	8ellSouth Corp.	59.88	0.88	1.5
NYS	21.50	5.88	8olt, Beranek & Newman	12.38	0.13	1.0
OTC	15.75	9.50	Brooktrout Technology	12.00	0.00	0.0
NYS	132.50	87.50	Cabletron Systems	94.50	-3.25	-3.3
OTC	43.00	17.75	Centigram Communications	22.88	-0.88	-3.7
OTC	60.25	34.75	Chipcom Corp.	37.75	-0.88	-2.3
OTC	40.75	20.13	Cisco Systems Inc.	24.38	-1.13	-4.4
OTC	18.38	9.25	Compression Labs Inc.	11.63	-0.75	-6.1
OTC	12.38	5.13	Computer Network Tech.	7.63	0.25	3.4
OTC	33.75	8.50	CrossComm	11.00	0.19	1.7
OTC	3.38	1.50	Data Switch Corp.	2.13	0.00	0.0
OTC	36.56	21.06	DSC Communications	22.25	0.13	0.6
OTC	3.50	0.61	Gandalf Technologies Inc.	0.61	-0.20	-25.1
NYS	17.63	8.00	General Datacomm Inds.	15.13	0.38	2.5
NYS	39.88	29.50	GTE Corp.	31.63	0.63	2.0
NYS	95.97	74.44	ITT Corp.	85.13	0.88	1.0
OTC	29.88	21.38	MCI Commmunications Corp.	24.00	-0.38	-1.5
OTC	7.75	1.50	Microcom Inc.	5.25	-0.50	-8.7
OTC	23.50	11.50	NetManage Inc.	16.38	0.38	2.3
OTC	7.25	3.50	Netrix Corp.	5.00	-0.50	-9.1
OTC	10.25	4.75	Network Computing Devices	5.00	-1.00	-16.7
NYS	11.13	6.63	Network Equipment Tech.	8.13	0.63	8.3
OTC	23.38	8.88	Network General	18.13	1.63	9.8
OTC	9.88	6.38	Network Systems Corp.	6.75	0.13	1.9
OTC	73.88	38.63	Newbridge Networks Corp.	40.38	-5.00	-11.0
NYS	38.63	21.38	Northern Telecom Ltd.	31.00	-0.13	-0.4
OTC	29.25	15.38	Novell Inc.	18.25	0.50	2.8
NYS	48.88	33.25	Nynex Corp.	37.38	-0.38	-1.0
OTC	30.00	18.75	Octel Communications Corp.	19.88	-0.13	-0.6
OTC	18.25	9.00	Optical Data Systems Inc.	15.00	-1.25	-7.7
OTC	7.50	3.75	Penril Data Comm Networks	4.06	-1.06	-20.7
OTC	27.25	10.00	Picturetel Corp.	14.25	1.50	11.8
OTC	8.25	3.63	Proteon Inc.	5.88	-0.13	-2.1
OTC	14.38	5.88	Racotek Inc. (L)	7.00	-0.25	-3.4
NYS	38.88	24.88	Scientific Atlanta Inc.	37.13	0.25	0.7
NYS	47.00	36.75	Southwestern Bell Corp.	42.25	0.75	1.8
NYS	40.25	29.63	Sprint Corp.	38.88	0.88	2.3
OTC	26.75	14.50	Standard Microsystems Corp.	17.50	1.00	6.1
OTC	23.75	10.75	Stratacom Inc.	22.00	1.25	6.0
OTC	40.75	16.06	Synoptics Communications	16.06	-4.44	-21.6
OTC	15.25	2.88	Telebit Corp.	5.38	0.44	8.8
OTC	46.00	20.25	US Robotics	31.75	0.00	0.0
NYS	50.75	38.25	U S West Inc.	40.75	0.63	1.6
OTC	43.88	19.38	Wellfleet Communications	25.25	-3.00	-10.6
OTC	28.25	12.75	Xircom	18.25	1.50	9.0
OTC	30.00	13.75	Xyplex Inc.	15.25	-0.25	-1.6

PCs and Workstations — OFF 0.91%

Exch	52-Week Range			June 3 3 PM	Wk Net Change	Wk Pct Change
OTC	7.50	2.63	Advanced Logic Research	4.50	0.00	0.0
OTC	58.25	22.00	Apple Computer Inc.	28.00	-2.50	-8.2
OTC	33.00	13.75	AST Research Inc.	16.63	-0.88	-5.0
NYS	119.63	43.13	Compaq Computer Corp. (H)	117.50	1.38	1.2
OTC	30.38	13.50	Dell Computer Corp.	29.63	0.88	3.0
OTC	25.00	12.38	Gateway 2000 Inc.	14.88	-0.13	-0.8
NYS	93.63	64.38	Hewlett Packard Co.	79.25	-0.13	-0.2
NYS	26.88	16.00	Silicon Graphics	22.25	-0.38	-1.7
OTC	32.63	19.75	Sun Microsystems Inc.	21.38	0.13	0.6
NYS	50.75	28.13	Tandy Corp.	37.75	0.38	1.0
OTC	5.13	2.38	Zeos International Ltd.	2.50	0.00	0.0

Large Systems — OFF 0.30%

Exch	52-Week Range			June 3 3 PM	Wk Net Change	Wk Pct Change
ASE	7.88	4.38	Amdahl Corp.	6.13	-0.63	-9.3
NYS	7.63	3.63	Convex Computer	4.63	-0.25	-5.1
OTC	4.50	0.50	Cray Computer	1.44	0.06	4.6
NYS	33.75	19.13	Cray Research Inc.	21.25	0.50	2.4
NYS	10.88	6.63	Data General Corp.	7.63	0.00	0.0
NYS	43.50	18.25	Oigital Equipment Corp.	20.63	-2.25	-9.8
NYS	52.25	36.38	Harris Corp.	47.75	1.38	3.0
NYS	64.13	40.63	IBM (H)	61.13	-2.75	-4.3
OTC	25.75	2.75	Kendall Square Research	3.25	0.00	0.0
OTC	18.75	8.25	NetFrame	9.75	-0.25	-2.5
OTC	26.00	6.25	Parallan Computer	6.75	-0.13	-1.8
OTC	23.25	6.50	Pyramid Technology	8.00	0.25	3.2
OTC	20.00	11.13	Sequent Computer Sys.	14.38	1.19	9.0
OTC	6.84	1.75	Sequoia Systems Inc.	4.06	-0.09	-2.2
NYS	33.25	20.25	Stratus Computer Inc.	30.00	0.13	0.4
NYS	16.38	8.50	Tandem Computers Inc.	12.00	0.50	4.3
OTC	30.00	9.75	TriCord Systems	13.50	0.50	3.8
NYS	16.50	9.88	Unisys Corp.	10.88	-0.13	-1.1

Software — UP 1.31%

Exch	52-Week Range			June 3 3 PM	Wk Net Change	Wk Pct Change
OTC	37.00	16.25	Adobe Systems Inc.	29.00	1.13	4.0
OTC	34.50	13.50	Aldus Corp.	27.75	0.38	1.4
OTC	8.38	4.50	American Software Inc.	4.88	-0.19	-3.7
OTC	15.75	6.75	Ask Computer Systems	13.00	-0.03	-0.2
OTC	61.75	37.00	Autodesk Inc.	51.75	-0.50	-1.0
OTC	4.50	2.06	Bachman Info. Systems	2.38	0.25	11.8
OTC	34.00	20.50	BGS Systems Inc.	23.75	0.38	1.6
OTC	71.00	44.50	BMC Software Inc.	58.50	3.75	6.8
OTC	30.00	22.50	Boole & Babbage (H)	30.00	0.75	2.6
OTC	25.25	8.50	Borland Int'l Inc.	9.25	-0.63	-6.3
OTC	25.00	9.50	Brock Control Systems Inc.	21.00	0.00	0.0
OTC	4.63	2.38	CE Software	3.25	0.63	23.8
ASE	30.34	16.91	Cheyenne Software Inc.	18.13	-1.88	-9.4
OTC	14.25	6.25	Cognos Inc.	11.25	0.50	4.7
NYS	44.88	26.50	Computer Associates	41.38	-1.50	-3.5
NYS	5.38	2.13	Computervision Corp.	3.75	0.00	0.0
OTC	48.25	21.00	Compuware Corp.	43.25	1.63	3.9
OTC	14.00	5.75	Comshare Inc. (H)	12.75	-0.63	-4.7
OTC	24.75	7.44	Corel Corp. (H)	24.75	1.75	7.6
OTC	7.75	3.38	Easel Corp.	3.75	-0.38	-9.1
OTC	29.25	11.00	Filenet Corp.	27.13	0.38	1.4
OTC	25.00	4.50	4th Dimension	5.13	0.25	5.1
OTC	12.50	5.25	Frame Technology	11.25	-0.25	-2.2
OTC	13.00	7.00	Group I Software	7.25	-1.25	-14.7
OTC	31.75	11.75	Gupta	11.75	-3.63	-23.6
OTC	12.00	7.25	Hogan Systems Inc.	9.25	-0.50	-5.1
OTC	29.50	16.00	IMRS	25.75	1.00	4.0
OTC	44.75	12.50	Information Resources	15.00	1.25	9.1
OTC	27.25	14.25	Informix Corp.	16.00	0.00	0.0
OTC	12.38	8.50	Intergraph Corp.	9.25	0.00	0.0
OTC	9.13	4.88	Interleaf Inc.	6.13	-0.56	-8.4
OTC	15.50	4.75	Intersolv Inc.	11.63	-0.13	-1.1
OTC	50.00	25.75	Intuit Inc.	35.50	1.63	4.8
OTC	18.75	8.75	Knowledgeware Inc.	9 38	-1 50	-13.8
OTC	37.00	15.50	Legent Corp.	32 00	1.88	6.2
OTC	86.50	30.25	Lotus Development	58.38	-2 88	-4.7
OTC	18.50	9.50	Magic Software Enterprises (L)	9.50	-0.88	-8.4
OTC	18.50	6.00	Manugistics Group Inc.	9.00	1.13	14.3
OTC	10.00	3.63	MathSoft	4.50	0.50	12.5
OTC	11.25	4.50	McAfee Associates	8.25	0.25	3.1
OTC	17.25	8.38	Mentor Graphics	10.88	0.13	1.2
OTC	34.88	11.50	Micro Focus	19.00	3.13	19.7
OTC	11.63	4.75	Micrografx Inc.	6.75	0.13	1.9
OTC	54.25	35.19	Microsoft Corp. (H)	53.00	0.50	1.0
OTC	38.00	19.88	Oracle Corp.	38.00	3.75	10.9
OTC	44.75	23.75	Parametric Technology	29.75	2.00	7.2
OTC	24.50	15.50	ParcPlace Systems Inc.	20.00	2.00	11.1
OTC	41.38	26.00	Peoplesoft	35.25	2.38	7.2
OTC	6.25	3.50	Phoenix Technologies	5.00	-0.13	-2.4
OTC	69.50	22.00	Powersoft	60.00	6.75	12.7
OTC	39.75	3.50	Platinum Software	5.94	0.00	0.0
OTC	14.75	7.25	Platinum Technology	13.38	-0.13	-0.9
OTC	60.25	33.50	Progress Software Corp.	34.50	-4.00	-10.4
OTC	3.81	1.94	Quarterdeck Office Sys.	3.13	0.06	2.0
OTC	32.00	13.00	Rainbow Technologies Inc.	14.63	0.00	0.0
OTC	11.38	4.00	Rasterops	5.00	-0.50	-9.1
OTC	14.50	3.75	Ross Systems	4.63	0.38	8.8
OTC	28.75	3.88	Sapiens Intl. Corp. N.V.	5.00	0.38	8.1
OTC	14.00	9.75	Softkey International Inc.	12.75	0.25	2.0
OTC	8.63	3.75	Software Publishing Corp.	4.88	-0.25	-4.9
OTC	17.25	7.75	Software Toolworks Inc.	14.50	0.00	0.0
OTC	13.75	6.25	State of the Art	7.00	-0.50	-6.7
NYS	35.63	17.63	Sterling Software Inc.	34.13	4.13	13.8
OTC	21.63	9.50	Struct. Oynamics Research	10.50	0.44	4.3
OTC	55.25	25.75	Sybase Inc. (H)	54.50	0.00	0.0
OTC	20.50	10.88	Symantec Corp.	14.00	0.50	3.7
OTC	52.75	33.75	SynOpsys	42.50	4.00	10.4
OTC	24.25	11.75	System Software Assoc. (L)	15.00	0.56	3.9
OTC	6.75	2.88	Trinzic Corp.	4.50	0.00	0.0
OTC	30.00	16.50	ViewLogic Systems	19.50	-2.75	-12.4
OTC	13.25	5.50	Walker Interactive Systems	7.00	-0.50	-6.7
OTC	60.00	17.50	Wall Data Inc.	39.75	3.31	9.1

Semiconductors — UP 7.45%

Exch	52-Week Range			June 3 3 PM	Wk Net Change	Wk Pct Change
NYS	32.75	16.75	Advanced Micro Devices	29.00	2.75	10.5
NYS	31.13	18.63	Analog Devices Inc.	29.50	1.88	6.8
OTC	29.13	10.88	Atmel Corp.	29.13	4.75	19.5
OTC	7.50	3.38	Chips and Technologies	4.75	0.25	5.6
OTC	44.63	15.75	Cirrus Logic	36.38	2.75	8.2
NYS	19.88	11.25	Cypress Semiconductor Corp.	17.13	0.63	3.8
NYS	20.00	13.00	Dallas Semiconductor	19.88	1.75	9.7
OTC	27.75	19.50	Integrated Silicon Systems	19.50	-0.38	-1.9
OTC	74.50	49.25	Intel Corp.	64.13	2.88	4.7
NYS	25.38	13.00	LSI Logic Corp.	25.38	2.00	8.6
OTC	26.75	12.25	Lattice Semiconductor	19.13	1.88	10.9
NYS	39.91	11.84	Micron Technology	36.00	4.13	12.9
NYS	54.88	40.31	Motorola Inc.	48.13	1.38	2.9
NYS	25.00	14.38	National Semiconductor	21.00	2.00	10.5
OTC	10.13	6.50	Sierra Semiconductor	7.88	0.13	1.6
NYS	89.50	55.75	Texas Instruments	83.00	5.38	6.9
OTC	18.88	7.63	VLSI Technology	15.50	1.63	11.7
OTC	14.38	3.38	Weitek	4.38	-0.25	-5.4
ASE	20.38	3.63	Western Digital Corp.	14.75	1.13	8.3
OTC	59.75	29.75	Xilinx	45.75	5.25	13.0
OTC	40.75	22.00	Zilog Inc.	34.25	2.50	7.9

Peripherals and Subsystems — OFF 0.16%

Exch	52-Week Range			June 3 3 PM	Wk Net Change	Wk Pct Change
OTC	30.50	16.50	American Power Conversion	22.25	2.50	12.7
OTC	24.75	17.13	Banctec Inc.	22.50	1.00	4.7
OTC	7.75	3.25	Cambex Corp.	4.22	-0.13	-2.9
ASE	8.25	2.63	Cognitronics Corp.	2.88	-0.31	-9.8
NYS	20.50	9.00	Conner Peripherals	15.00	0.13	0.8
OTC	39.25	17.50	Creative Technologies Inc.	30.63	-0.63	-2.0
OTC	22.00	4.75	Oata Race Inc.	6.75	1.25	22.7
ASE	10.75	4.13	Dataram Corp.	4.38	-0.50	-10.3
NYS	23.00	7.50	EMC Corp.	16.25	-1.00	-5.8
OTC	8.25	3.13	Emulex Corp.	6.00	0.13	2.1
OTC	21.00	14.25	Evans & Sutherland	15.50	-1.50	-8.8
OTC	22.50	7.50	Exabyte	17.25	2.50	16.9
OTC	34.00	6.63	Intelligent Info. Systems	6.63	-0.75	-10.2
OTC	4.38	2.00	Iomega Corp.	2.25	-0.38	-14.3
OTC	9.75	5.75	IPL Systems Inc.	6.25	0.00	0.0
OTC	28.50	13.75	Komag Inc.	23.00	1.00	4.5
OTC	8.63	4.38	Maxtor Corp.	5.81	-0.19	-3.1
OTC	8.75	4.88	Micropolis Corp.	6.50	-0.38	-5.5
OTC	22.50	10.00	Pinnacle Micro Inc.	15.50	-0.25	-1.6
OTC	9.75	6.25	Printronix Inc.	9.75	0.38	4.0
NYS	11.75	7.38	QMS Inc.	8.00	0.00	0.0
OTC	20.25	9.38	Quantum Corp.	16.00	0.25	1.6
OTC	9.13	3.13	Radius Inc.	5.25	-0.13	-2.3
NYS	17.75	8.88	Recognition International	8.88	-0.25	2.7
OTC	6.88	3.63	Rexon Inc.	5.75	-0.38	6.1
OTC	28.75	14.38	Seagate Technology	23.44	0.31	1.4
NYS	41.63	23.75	Storage Technology	32.75	1.50	4.8
NYS	33.38	21.38	Tektronix Inc.	29.25	0.50	1.7
NYS	104.88	69.88	Xerox Corp.	103.88	2.75	2.7

Services — UP 0.[illegible]%

Exch	52-Week Range			June 3 3 PM	Wk Net Change	Wk Pct Change
OTC	23.25	14.88	American Mgmt. Systems (H)	23.13	0.50	2.2
NYS	4.25	2.38	Anacomp Inc.	3.13	-0.13	-3.8
OTC	23.50	14.50	Analysts Int'l	16.75	0.75	4.7
NYS	56.88	46.88	Auto Data Processing	53.00	0.38	0.7
OTC	18.25	9.25	Cambridge Tech. Partners	17.38	0.63	3.7
NYS	24.88	14.00	Ceridian Corp.	24.63	0.00	0.0
NYS	24.25	13.88	Comdisco Inc.	21.25	0.63	3.0
OTC	12.50	4.84	Computer Horizons	10.25	0.00	0.0
NYS	44.00	24.75	Computer Sciences	43.38	0.25	0.6
NYS	9.00	6.00	Computer Task Group	9.00	-0.13	-1.4
NYS	34.75	12.00	CompUSA Inc. (L)	12.00	-1.00	-7.7
OTC	13.50	7.75	Control Data Systems Inc.	11.00	0.13	1.1
OTC	11.00	6.63	Egghead Discount Software	7.63	0.13	1.6
NYS	38.00	26.00	General Motors E (EOS)	35.25	1 75	4.7
OTC	22.75	10.50	Inacom Corp.	13.50	1.00	8.0
OTC	28.00	12.25	Intelligent Electronics	22.75	1.63	7.7
OTC	22.50	10.38	Merisel	17.25	0.38	2.1
OTC	32.50	8.66	Microage Inc.	25.75	0.13	0.5
OTC	40.50	25.66	Paychex	31.25	-1.63	-4.9
NYS	39.75	21.63	Policy Management Sys.	33.25	1.38	4 3
NYS	24.88	17.88	Reynolds and Reynolds	23.63	0.88	3.8
OTC	28.50	15.13	SEI Corp	18.25	0.50	2.8
OTC	29.38	17.50	Shared Medical Systems	22.63	-0 56	2.4
OTC	11.50	5.63	SHL Systemhouse	7.00	0.13	1.8
OTC	30.75	11.00	Software Spectrum Inc.	11 25	-0 25	2.2
OTC	42.75	29.25	Sungard Data Systems	35.25	0.25	0.7

KEY: (H) = New annual high reached in period (L) = New annual low reached in period
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Wysiwyg

Top roadside attractions on the information superhighway

Museum of Lost Messages

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Internet Hall of Flames

Come see the world's largest collection of biting remarks, nasty rejoinders and just plain heartless verbal assaults! Exit at **wouldbe.oscarwilde.donrickles.hockey.puck**

Rosie's Roadside Burlesque

These files become corrupt at an early age.
See our files unzipped to reveal all!
See our famous character-stripping routines!
See our tantalizing file-allocation table dances!
Find us at **gypsy.roselee.spinning.in.grave**
(ADULTS ONLY, PLEASE)

SOURCE: BILL OAVIS, EMORY UNIVERSITY

IF GOD HAD AN INTERNET ADDRESS, WHAT WOULD IT BE?

god@heaven.edu

root@universe.org

root@net - whaddayamean, subdomain?

god@*.*

@
An omniscient God wouldn't need an E-mail address because He would know you were going to send it before you sent it.

THE FLIP SIDE?
SATAN@HELL.COM

SOURCE: QUESTION AND ANSWERS POSTED ON THE INTERNET

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- THE PROGRAM WILL NOT SEND MESSAGES TO ATHEISTS.
- CONNECTION TO HELL IS OUE IN RELEASE 666.
- BECAUSE OF THEIR SIMILAR STRUCTURES, FEATURE SETS AND EASE OF USE, THE CONNECTION TO PROFS IS DUE AT THE SAME TIME AS THE CONNECTION TO HELL.

SOURCE: THE INTERNET

Illustration & design by Dave Marshall. Compiled by Lory Dix.

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Inside Lines

Eureka! A software project that's not delayed

IBM is telling industry analysts that it is a couple of months ahead of schedule in developing a version of the DB2 database that could be shared by different processors in its new System/390 Parallel Transaction Server. DB2 support had been promised by mid-1995, but IBM is now eyeing an April ship date, said Charlie Burns of Gartner Group, Inc. in Stamford, Conn. Chris Arnold, general manager of IBM's Santa Teresa Laboratories, said recently that the DB2 implementation should be ready for beta testing by September, with general availability to follow in the first half of 1995.

Notes 4.0 = Lotus Communications Server

Lotus managed to confuse its customers when it announced last September that Lotus Communications Server (LCS) would be its next-generation messaging platform. Now, many think of the forthcoming LCS as a new product. Really, LCS is just a version of Notes that includes a combined CC:Mail and Notes messaging transport technology and updated clients. It may be the same product as Notes 4.0, which should ship in mid-1995, according to Cliff Conneighton, senior director of the Lotus Communications Products marketing group. "It's not a technology question. It's a naming question," he said.

DECked out

In the spirit of the proposed merger between outsourcer Electronic Data Systems and telecommunications provider Sprint, another cross-industry combination could be in the works. AT&T is talking to Digital about buying its outsourcing practice, according to Oliver Pflug, an outsourcing analyst at G2 Research in Mountain View, Calif. An AT&T spokesman said the company does not comment on negotiations but noted, "We do as a matter of routine talk to other companies."

Life in the 4th Dimension

When Computer Associates and Electronic Data Systems buried the hatchet on their often-heated, 28-month legal battle last month, both companies said the settlement was a "win-win." However, sources close to EDS are certain one vendor will end up short-changed: 4th Dimension Software. After EDS discontinued its use of CA systems software throughout its worldwide data centers in 1992, 4th Dimension stepped in as the replacement vendor. Now that CA and EDS are pals again, 4th Dimension products could get the boot. Still, 4th Dimension CEO Yossie Hollander says otherwise. "As far as we're concerned, we still have a contract with EDS," Hollander said.

Computer comedy a la Gomez

John Astin, the actor best known for his television role as Gomez in *The Addams Family*, will host the world's first computer comedy contest at Lap & Palmtop '94 in Los Angeles next week. The benefit will raise money for the Pediatric AIDS Foundation. The show is among the largest exhibitions of portable computing and communication products in the industry. Prospective contestants may enter the contest by calling Laptop Expositions at (800) 444-EXPO. Those not competing can attend for a $20 donation to the AIDS Foundation.

More than 40 executives from U.S. and international companies will gather this week in Nantucket, Mass., for a "technology boot camp" sponsored by Computer Associates and The CEO Institutes. The goal: to prepare the CEOs for 21st century technology through one-on-one training in basic computing. The theme: "The CEO in a Wired World." We have just one piece of advice for CA Chieftain Charlie Wang: Be gentle with them. . . . But for more regular connection to the wired world of computing, try getting in touch with Computerworld *with news items or tips. Call our 24-hour voice-mail tip line at (508) 820-8555 or our toll-free number at (800) 343-6474. News Editor Maryfran Johnson can be reached by phone at (508) 820-8179, via the Internet at mjohnson@cw.com or through MCI Mail at 590-8017.*

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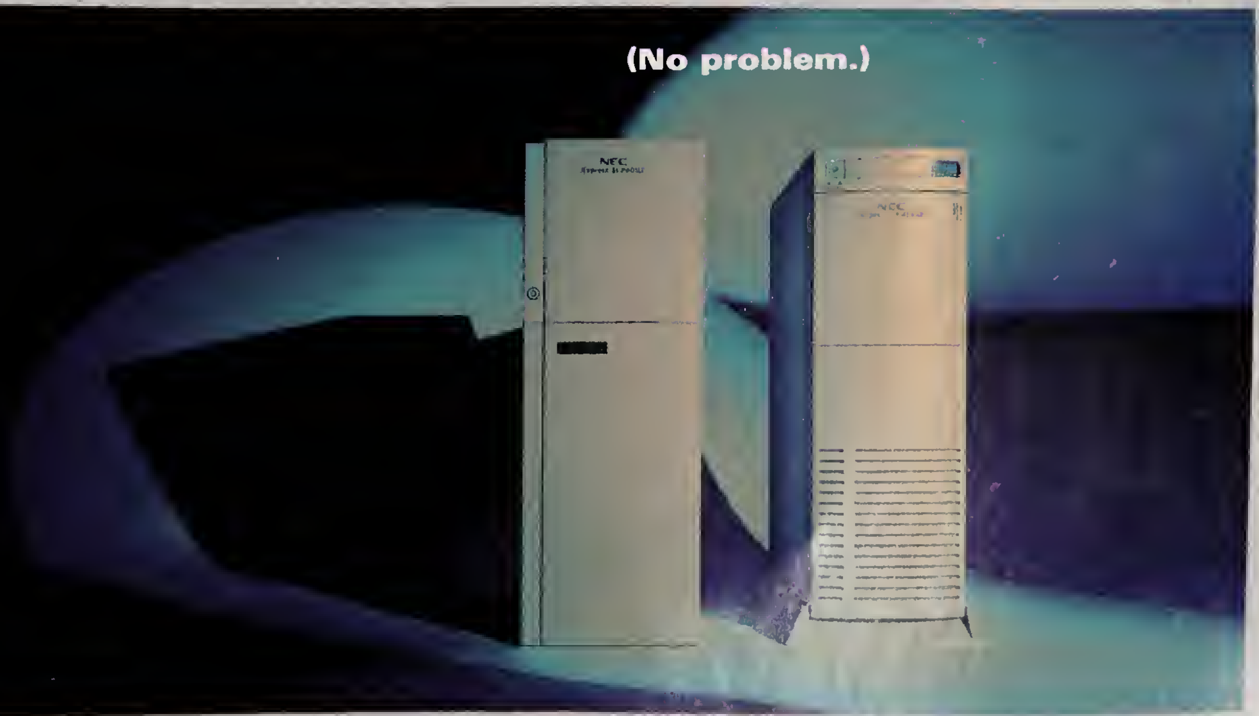

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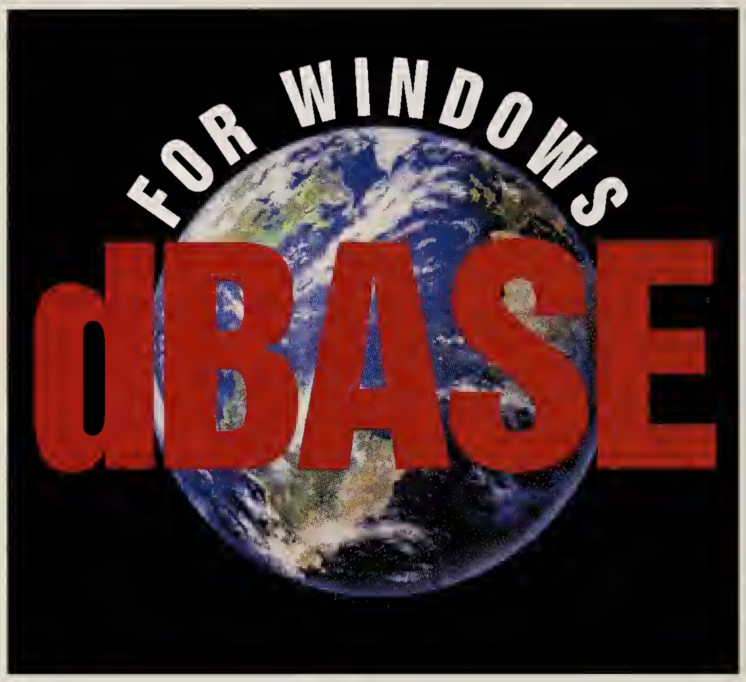

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